

NIERNSEE (J. R.)

VIENNA INTERNATIONAL EXHIBITION, 1873.

REPORT

ON THE

CONSTRUCTION AND EMBELLISHMENT

OF

PRIVATE DWELLINGS IN VIENNA.

BY

JOHN R. NIERNSEE, F. A. I. A.,

MEMBER OF THE ARTISAN COMMISSION OF THE UNITED STATES.



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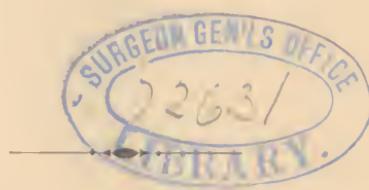
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CHAPTER I.

HISTORICAL SKETCH OF THE VIENNA SYSTEM OF DWELLINGS.

VIENNA, ITS SIZE AND LOCATION; ORIGIN OF APARTMENT-HOUSES; SIZE; EXTENSION OF THE CITY IN 1858; ITS PREVIOUS SLOW GROWTH; ORIGIN OF THE ZINS OR RENTED HOUSE; ARRANGEMENT; DEVELOPMENT OF PRESENT SYSTEM; APARTMENT-HOUSES, THEIR ARRANGEMENT; EXAMPLES.

1. To fully elucidate the subject of this report on "private dwellings," we give a brief historical sketch, showing the origin of this class of dwellings, and the causes which gave them the peculiar and distinctive features of their present form, as habitations for the large majority of the people of this city—Vienna.

The capital of the Austrian Empire is situated in the vast valley called the March-field, on the banks of the Danube. It was known already as a Roman city in the second century, and was adopted by the Hapsburg family as their residence A. D. 1276. The city has remained in their possession to the present day. It now contains, in round numbers, 1,000,000 inhabitants, and is over twelve English miles in circumference. Up to the year 1859, the city proper was small, and was surrounded by high and formidable walls, encircled by a deep moat, over which twelve bridges gave access to the inner or old town, around which grew up gradually thirty-four new districts or suburbs.

2. The inner city was mostly occupied by the palaces of the nobility, and by large ancient buildings, subdivided and used for lodgings or so-called "apartment-houses." They were not generally (or were only imperfectly) suited to that purpose. The same plan was used, but in a more humble and cheaper way, and on a smaller scale, in the suburbs of later date.

3. Some conception of the magnitude of those old structures used as "apartment-houses" may be formed from the fact that several of them, which are still existing, and used for the same purpose, contain each from ten to twelve different large interior court-yards, and a much larger number of staircases. Such are the so-called "Burger Hospital," in the inner city, near the new opera-house, the Drahtner Court, and the Count von Stahremberg mansion, in one of the suburbs, said to contain each from 1,500 to 2,000 inhabitants. Many of these old buildings are from six to seven stories in height above, and generally two cellars in depth under ground.

4. Since the demolition of the old fortifications in 1858, the filling up

of the large trench and leveling of the glacis, large building-space has been gained, which has been extensively built upon already, and which is now adorned with numerous magnificent edifices and splendid palaces. The central part of the old town, or city proper, which is of almost circular form, is surrounded by a wide street, called the Ringstrasse, a superb avenue, with wide sidewalks, rides and carriage drives, and traversed by street-railways. It is crossed at the north end by the Danube Canal, and on the west by a smaller stream, called the River Wien. Thus the demolition of the old wall and improvements connected therewith have incorporated the formerly outlying thirty-four suburbs, with the old town, into one city, the extreme outlines of which are still surrounded by a barrier and ditch, called the Lines. The new "Danube Regulations," begun in 1870, will furthermore add a very extensive tract in expansion of the city.

5. Prior to the enlargement of the city in 1858, the old dwelling-house or "zins-house" (house for rent) was only an aggregation of living-rooms, which were to be more or less separated or united, according to the wants or wishes of the tenant, and which had to be occupied whether right or wrong, suitable or otherwise, on account of the scarcity of dwellings in the old metropolis. For, while the population in the fifty years between 1800 and 1850 had more than doubled, the number of houses increased only by 2,000 in the same period. Before the great political changes of 1848, and the subsequent enlargement of the city in 1858, the want of space, great cost of building-sites, and particularly the old oppressive building-laws, requiring heavy arched cellar and ground floors, (before the rolled-iron beams and light arches were invented,) and, consequently, walls three and four feet in thickness, and compelling many other expensive constructions, it was almost impossible, even for business-men of good means, to rent, in any eligible neighborhood in the city, a house embracing more than three or four apartments, inclusive of kitchen.

6. For this reason, many badly-planned and ill-ventilated apartment-houses were erected, consisting of very small suits of rooms, arranged to sublet rooms to secondary tenants, to the great inconvenience of all. Thus were developed those rows of apartment-houses, (or dwellings for rent,) called "zins-houses," in the former suburbs of Vienna, of which Plate I shows the type, four, five, and even six stories in height, containing several separate tenements on each floor, each consisting of only three or four apartments, viz, a kitchen, one or sometimes two rooms, and a cabinet, (*kammer*,) which latter is always understood to be a small room with *only one window*. Even the latter room was so arranged, with a separate entrance from the kitchen, so as to be able to sublet it. A stair and corridor, always of fire-proof construction, give access to all the rooms. Better and larger buildings were subsequently arranged, with more rooms and conveniences, such as the addition of a servant's room in connection with the kitchen, an extra chamber, and sometimes an

"ante-room" and pantry, better arranged and more completely detached water-closets, &c. (See Plates II, (A-H,) and III, (A-D.)

7. The construction and contrivance of the generally contracted kitchen, particularly where a cook has also to find her sleeping-place in it, are really ingenious. A large portion, generally the back half of the kitchen, is devoted to the cooking, and often ~~the stand-up or covered bedstead~~ is divided off by a beam or girder lying across from wall to wall (for all the partitions are of brick) about the height of the head, say five and a half to six feet at most, above the floor, from which beam the brick arching is turned up toward the ceiling, and the large open mouth of the chimney in the back, or so-called middle, wall of the house; by forming thus, as it were, a mantle or large hood over the range, and the space within the cross or hearth beam is in the shape of the large kitchen-chimney of ancient castles and monasteries, an excellent draught is created both for the fire and for carrying off effectually all the odor of cooking. Their compact brick and plastered kitchen-ranges, with brass-bound curbs, and with no iron but the top plates, glazed earthen vessels for cooking, small stew-holes and ovens, all wonderfully neat, compact, and effective, are well contrived and worthy of study and imitation. When the cooking is done, the fire is never kept up a minute longer than absolutely necessary. A curtain, sliding on rings on a rod fastened to the hearth-beam, is drawn close. No sign or smell indicate the presence of the cooking-apparatus. The floor is generally laid with hard stone or encaustic tiles.

8. After 1858, the enlargement of the city space, and the altered political and social conditions of the citizens, brought about by the changes of 1848, gave building matters a new impulse and direction. The desire of the inhabitants for a better system in the arrangements of their dwellings, more compatible with their new views and wants, was ably seconded by several of their most eminent architects and master-builders, who devised and perfected such plans as made, finally, the living in rented apartments not only bearable, but pleasant and convenient, nay, made it absolutely comfortable and even luxurious, more economical, and devoid of much care and responsibility, as compared with living in entire and separate houses after our American fashion.

9. From this time dates the present complete system of apartment-houses of the various classes, and of more or less pretension, which constitute virtually the "private dwellings" of at least nine-tenths of the citizens of Vienna. Only the highest and wealthiest of the nobility, perhaps a ~~score~~ of millionaires, and the members of the imperial family, some wealthy bankers, and a few merchants occupy entire houses (here called palaces) by themselves. The eminent architects, Vandernüll and Siccardsburg, are said to have been the promoters, if not virtually the founders, of the present perfected system of apartment-houses. The requirements of an average-sized tenement under this system are an isolation from the common stair and corridor of the house by means of

an inclosed vestibule, or ante-room, giving access to the kitchen, and to at least one living-room. This should also afford access to the water-closet and pantry, all well-lighted and ventilated. In connection with the kitchen should be a servants' room, which ought to communicate with a chamber and nursery.

Plate IV represents the details of the ground and first floor of such an apartment-house, which, at the same time, forms a *group-building* belonging to four different owners, fronting on three streets, and facing on the main street 132 feet, with a depth of 174 feet on the side streets, with four separate entrances or carriage-ways, each 8½ feet in width, and leading to a very ornate grand common court-yard of 64 feet in length, and 38 feet in width. There are, besides, several smaller courts one for the use of each building, with a large fire-proof stair-case of 6 feet width of steps for each. The general arrangement and uses of each set of apartments will be seen in Plate V, (A-II.)

The ground-floor is occupied by offices and reception-rooms, the first floor by the living-rooms of the owners, and the third floor *only* by one separate tenant.

10. Before proceeding further with the description of the development of the *dwelling*, from its simplest to its most expanded and ornate form, we must take note of a peculiar local feature in the configuration of the main business streets of the city, in regard to their influence on the arrangements and construction of these buildings. Where broad main, streets lead from the circumference of the outer districts to the inner, or old city, the ground-floor of a dwelling on such a street is generally devoted to business-purposes, while in the less frequented side streets that floor is used for inferior lodgings, work-rooms, or shops.

11. The first floor above the ground (*ebener erde*—even with the ground) is called the ground-floor, or *parterre*, and what with us in America is called the second floor is with them the first floor, also called "*belle etage*," or "*best floor*." In many of the buildings of greater pretensions, a lower or intermediate story interposes between the ground and principal floors, and is here called a "*mezzanine*," an Italian term, corresponding in meaning to the French "*entresol*." This is generally used for domestics' lodgings and other purposes. The section immediately below the ground-floor is called "*souterrain*," or sub-cellars, and in it are generally the stables of the larger and more pretentious town-houses when devised as apartment-houses. It is accessible by convenient inclined planes, called "*rampe*," for the descent of the horses. Below this sub-cellars is frequently the cellar proper, for fuel, wines, &c. The place directly under the roof, with us called *garret*, is never allowed to be inhabited, in accordance with the existing building-laws.

12. The reader of this description of the "apartment-house," as the principal dwelling-place of the population of Vienna, must not confound it with what is familiarly known to us under the name of *tenement-houses*. The so-called apartment-house in Vienna is the house of the majority of

every class and condition, from the poor student or clerk to the tradesman and merchant, or to the highest nobility of talent, industry, wealth, or title. As an enthusiastic admirer of the system expressed himself, perhaps sarcastically, "No city in the world is better calculated for life in lodgings than Vienna, as all the necessaries are abundantly provided out of doors."

13. A fine example of a first-class apartment-house is represented by Plate VI, in which A represents the first floor and B the plan for the second and third floors. This building has street-lights only from two sides; the remainder is lighted from the courts. It shows an example of a dwelling in which the ground-floor is occupied by offices, stables, carriage-houses. The first or principal floor is wholly occupied by the owner of the building. It has a semicircular private stairway and a large main stairway which leads to the upper stories. The accommodations in the owner's dwelling, on the first floor, are very extensive, consisting of culinary and domestics' apartments, pantries, and store-houses, four water-closets, bath and dressing rooms, ante-room, teachers' and governess's rooms, nursery, library, boudoir, reception and card rooms, parlors, dining-room, and billiard-room. The second and third floors are each arranged in three convenient sets of apartments, containing, respectively, four, twelve, and eight rooms per set. This building is sometimes called a "palais," the word, nevertheless, not meaning strictly palace; it is a sort of diminutive of the latter term, which they only apply to such buildings (whatever may be their size) as are not strictly "apartment-houses," but are occupied only by the owner, his servants, and immediate dependents and employés.

Another example of these first-class apartment-houses is the so-called "palais" of the banker Epstein, Plate VII, showing the first floor. This splendid dwelling, built on the Court Ring in 1871, contains in *souterrain* (sub-cellars) the stables of the owner, accommodating eight horses, and also for the tenant on the second floor, with room for six horses, with the necessary feed and harness rooms, an ice-cellars and ample cellarage for fuel for all, and heating-apparatus for the larger rooms of the owner. On the *parterre*, or ground-floor, are located the offices and counting-rooms of the owner, carriage-house and *concierges* lodging, and a spacious decorated entrance-drive to the court-yard. On the first, or principal, floor are arranged the artistically-decorated living-rooms of the proprietor, with renaissance ceilings in stucco, fresco-painting, and gilding by skilled artists, walls with seagliola marbles, costly and tasteful walnut wainscoting and tapestries. The walls of the card-room are decorated with fine landscapes. In the lettering of the plan, A designates the court-yard; B, small open courts for light and ventilation of private stairs, corridors, and water-closets; C, the rectangular grand stairway, which leads also to the second floor, and is highly decorated with variegated marble, seagliolas, and statuary; D, a second semicircular fire-proof stair, which leads to the second and third floors, oe-

cupied by one tenant on the second, and arranged for three sets of apartments on the third floor. A small oval private stairease, E, leads to the upper stories, and is principally used by the servants. The owner's lodging contains, No. 1, ante-room; No. 2, teachers' room; No. 3, sons' room; No. 4, library; No. 5, work-room or study of the owner; No. 6, card-room; No. 7, dining-room; No. 8, music or ball room; No. 9, reception-room; No. 10, boudoir; No. 11, family chamber; No. 12, nursery; No. 13, daughters' room; No. 14, governess's room; No. 15, baths; No. 16, wardrobe; No. 17, waiting-maid's room; No. 18, kitchen; No. 19, pantry; No. 20, waiting-room; Nos. 21 and 22, closets; No. 23, winter-garden or conservatory; and besides, three water-closets. The servants' rooms are located in the entresol, or mezzanine.

14. *Building-group.*—It is often the case that quite a number of otherwise distinct dwellings, owned by different parties, are grouped together in their external architectural features, under one general design and style, for the sake of producing a grand effect by a combination of masses, which could not be as well accomplished otherwise. This is an effectual, and also an economical, means of attaining this effect, as well as of combining the otherwise small courts of each into one or more larger court-yards. It is better for light and ventilation, for, as a rule, only the inferior rooms, corridors, kitchens, &c., are located on those courts, unless the latter are very large and ornamental.

15. One of the grandest examples of this kind is presented by the building, Plate VIII, called "Henry's Court," on the Opera Ring. It consists virtually of three separate apartment-houses, combined under one design and façade. The buildings occupy a whole square of 310 feet length, and 150 feet in depth, bounded by four streets. The central building forms a projection on the plan, and is one story higher than the side or end buildings, and rises like a tower above the rest. The façade of the parterre and mezzanine are treated as a grand rustic sub-base or dado. The windows of the first and second floors are coupled in connecting groups, and the third story is treated with pilastered windows and intermediate connecting panels, painted in rich frescos on gold ground. Architectural decorations and statues are executed in terracotta with excellent taste. The whole forms a magnificent apartment-dwelling.

Plate IX represents the plan of the principal or first floor of another such group of buildings, on a very irregularly-shaped piece of ground, two sides and a corner facing on streets. It was built by the Union Building Association. The effective façade is treated in the French renaissance style. The ground-floor contains stores and restaurants; the four upper stories are each divided into four large and convenient apartment-lodgings. This building has just been finished.

CHAPTER II.

CONSTRUCTION AND EMBELLISHMENT OF DWELLINGS.

VIENNESE BUILDING-MATERIALS; STONE BUILDINGS RARE, BRICK BUILDINGS COMMON; METHOD OF PLASTERING CEILINGS; QUALITY OF LIMES AND CEMENTS; BUILDING-LAWS; FLOORS, CEILINGS, AND DETAILS; PRECAUTIONS AGAINST FIRE; SELF-CENTERING ARCHES.

16. Having thus fully illustrated the origin and development of the present system of dwellings in Vienna, both in its simplest and most expanded and ornate design, we will next examine the methods of construction and embellishment. The materials used in construction first deserve consideration; Vienna is extraordinarily well favored in regard to the abundance in the vicinity of a variety, and of superior qualities, and also by extensive land and water communications with the neighboring provinces. Of ordinary hard quarry-stones for foundations there is an excellent and abundant supply in the vicinity. Of superior sandstones, soft and of middling and of hardest qualities, generally of a light-yellow or pale-buff color, much resembling the French Caen stone, there are sixteen different varieties used here. The Vienna and Emperor's sandstone, the Magarieth and Loretto are favorites, and are extensively used for external window and door dressings, ashlar facings of walls, and ornamental cut-stone work in general. The harder kinds are generally used for steps and platforms of interior stairs, corridors, and bases of the buildings. For monumental works, columns, &c., granite as well as marbles from Karst, Untersberg, Salzburg, and Silesia, and variegated Hungarian and Bohemian marbles are used.

17. Solid sandstone constructions, except for Gothic churches, are, however, rarely used. Only *facings* of stone for public buildings, and the more costly palaces and dwellings, are employed. Of entire marble façades there are very few in Vienna. The favorite and almost universal building-material is brick of superior quality and hardness, which is produced in immense quantities in the immediate surroundings of the city. Externally the walls are covered with a superior quality of mortar, made of the celebrated Kuffstein or other hydraulic cement mixed with sharp river-sand. This mortar acquires fully the hardness of the sandstones, and is not only used in plain surfaces, but all their cornices, window, door, and other architectural decorations and features, are worked out with surprising accuracy, strength, and beauty by their skilled masons in that material. To illustrate this use of cement a view, taken from a photograph, is annexed of the front of a new dwelling

on the Ring street, (Plate X,) the whole of which is done in this hydraulic mortar. The more florid ornaments, capitals of columns and pilasters, &c., are cast in cement and terra-cotta, and the whole is colored a pleasant and uniform light-buff color, resembling stone. The masons build both the stone and brick walls, turn all the arches, and do all this external plastering or cement stucco and coloring.

18. The interior stucco-work, or plastering of walls and ceiling, is done by the regular plasterer. In this connection, one peculiarity in the mode of plastering their ceilings deserves special notice. Their ceilings, and also the floor-joists of their solid timber floors, where the beams lie close to each other, side by side, do not admit of lathing for plastering as in our dwellings.

They adopt the following method: Stout lathing-nails with rather large flat heads are driven first partially (say half way) into the ceiling-joists at distances of seven, eight, or nine inches apart, as first, second, or third quality work may be desired, forming regular squares. The uniform spacing of the nails is quickly and accurately done by marks or notches cut on the handles of the small hatchets with which they drive them, and they range them by the eye. On these nails, just above the heads, stout copper wire (also of a size according to the quality of the work) is loosely stretched by giving the wire one turn around each, and in a direction *crosswise* of the ceiling-beams, thus forming a loose wire netting hanging down from the ceiling from three-fourths of an inch to one inch. Instead of laths they use reeds or small canes. These reeds come in bundles of about twelve to fifteen inches in diameter, and six to seven feet in length; none of the reeds must exceed three-quarters of an inch in diameter at the thickest end. The extremely thin ends are cut off, so as to have none less than one-quarter inch in thickness at the smallest end. They are introduced between the wires, at such distances from each other as to afford a proper key between them for mortar. They are also reversed between alternate squares, so as to have the ends of one pushed in and overlapped between the thicker ends of the other square, thus equalizing the thickness. After this the nails are driven moderately well ~~home~~, without forcing the wires into the reeds, so as to injuriously bruise or cut them. Next, rich tenacious plastering mortar is *flung on them* with a scoop-trowel and then finished in two or three coat work, as with us, or as the nature or finish of the work required. The interstices between the faces of the reeds and their round shape form a frequent and excellent key or holdfast for the mortar. The reeds are also seasoned before being used.

19. The sand used for building, both pit and river sand, is of superior quality, as also are their common and hydraulic limes and cements. The bricks of all manufacturers are of the standard size of 11 inches in length, $5\frac{1}{4}$ inches in width, and $2\frac{1}{2}$ inches in thickness. Of woods, both for building and ornamental purposes, they have an abundant supply from the forests of the various provinces. They are generally

transported by water. The hard woods of Hungary, such as oak, ash, and walnut, are particularly rich and valuable. Iron has been brought into use in the construction of buildings of late years, and is employed principally for girders and beams. Some roofs and stairs of public buildings, conservatories, and many bridges, both on the arch and suspension principles, are built in iron, but buildings entirely of iron have not been introduced here as yet, although they have an abundance of superior quality throughout the empire.

20. Besides the excellent quality of the limes and sand they employ for their mortars, their treatment in mixing and using them is worthy of notice and of imitation. Their first proceeding toward the erection of a new building is the digging of large pits, say eight to ten feet square, and of about the same depth. If the ground should be too loose or porous, they surround or case them with light brick walls.

The lime is carefully slaked in a large trough supplied with a small gate and a tolerably fine-meshed wire screen at one end, immediately above the lime-pit, and as each trough-full is thoroughly slaked and agitated, and brought to a uniform degree of fluidity, it is drawn off into the lime-pit. The operation is repeated until, one after the other, these pits are filled. The number of lime-pits thus filled, and the quantity prepared, is generally such as to furnish from four to six months' supply for the building; and as one is emptied it is freshly filled until its turn, at the proper interval of time, comes again for use. This fluid slaked lime, originally of the consistency of thick cream or molasses, will cool off, settle, and consolidate, in the course of several weeks, to about the consistency of soft butter or paste, and the water separating from it during its partial consolidation, and standing to the depth of several inches on top, will keep it good for months, or even a year or more, in the proper pasty consistency, ready to be mixed with the sand when required to be used for making into mortar. If the lime remains an unusually long time in the pit, and absorbs all its own water, more is poured on to keep it in its pasty condition; for when it once hardens, it is no more fit for use than plaster of Paris after it has set. When the lime is wanted for mixing into mortar, it is lifted out of the pit by a long-handled broad hoe and put into the mortar-mixing trough with the proper measured proportion of sand and of water to thoroughly reduce it to a semi-fluid condition. It is carried in round flat tubs or buckets to the workmen, who are supplied with small deep troughs holding about the quantity of a good-sized barrel. The mortar is used in so fluid a state (almost what we here technically call "grout") that it could not be taken up on our ordinary trowel. There the masons use large concave trowels, shaped somewhat like sugar-scoops. A superior and skilled laborer, called a mortar-mixer, is employed in the preparation of the mortar.

21. This system of slaking and cleaning the lime by running it through a wire sieve, and mixing it thoroughly with a proper proportion of sharp

clean sand, and then applying it in this semi-fluid state, has much to do with the superior quality of their mortar, and consequently with the strength of their walls and the durability of their exterior coating. Their bricks being rough, well bedded, and rubbed or hammered down into this soft mortar, filling up all the vertical interior joints of the brick-work, it gives all the strength and solidity of "grouted" walls, while at the same time the mason is not allowed to bring the mortar either on the bed or the vertical joint, nearer than within half an inch of the face of the wall. This is required to give a proper hold or *key* to the mortar when both the exterior and interior rough-cast plaster coating is put on in the finishing of the building. Some buildings, as the new arsenal, some railway-stations, and a few churches, are finished with face brick. Sometimes they are of various colors, such as pale red, gray, or buff; or they are dark, and dressed off with terra-cotta panels and other embellishments, as sandstone window-trimmings, bands, and bases.

22. The construction of dwellings is in many respects so guarded, and regulated by numerous regulations and strict building-laws, that the latter give a certain uniformity to the former, and in describing their construction we almost quote the law. Thus they require that the main walls, front and rear, should not be less than 18 inches for the last or topmost story of the building, and as now no building is permitted to be more than four stories in height above the ground floor, or thirteen fathoms, 78 feet, from the top of the cornice to the sidewalk, they permit the walls for two stories down to be made the same thickness, while they are to increase in thickness by the width of one brick, six inches, and below that as follows: From the top down, 18 inches for fourth and third stories; 2 feet for second and first floors; $2\frac{1}{2}$ feet for the ground floor, and at least 3 feet thickness, as prescribed by law, for the cellar. They always have also what is called a middle wall, in which the chimney-flues are located, and as the floor-joists are to lie six inches on the wall on each side of this wall, and as the law prescribes that not less than one foot of brick-work shall intervene between the ends of these joists, we have two feet in thickness, except the upper story, which may be eighteen inches. All party-walls must be at least one foot in thickness for each party. All division-walls between different apartment lodgings in the same house must be one brick, or twelve inches; interior partitions one-half brick, or six inches thick. While building, the front must be temporarily fenced in for six feet in width outside the building-line for safety of passers-by.

23. Cellars under ground, containing stables and feed-rooms or workshops, must have a brick arched ceiling. Others may have solid timber joists or beams, but always 4 inches depth of pugging or earth-filling (generally of old plastering; old mortar-rubbish, screened, is used for that purpose) between the ceiling-joists and flooring. Their wooden floors or ceilings between the stories are generally of two kinds, either

of floor-joists standing on edge, like ours, but only 12 inches apart between centers, or for wide spans solid timber laid close together and connected by tree-nails, all with 4 inches depth of pugging between them and the flooring. The latter kind (solid timber) are always used in the story immediately under the roof, as that floor must be made fire-proof by being paved with brick laid in cement.

24. The stair-walls, when of brick, must run up to the roof-timbers, and the entrance from the stair to the roof-space must be secured by an iron door, set closely into stone jambs. The roof-space is only divided into what we call "lumber-rooms" for the various occupants of a house. No chamber or living-room is ever permitted there under any circumstances. Each chimney-flue must have a well-secured double iron door, opening under the roof 3 feet above the floor, for cleaning. Each roof over 45 feet in length must have a 6-inch fire partition-wall, with an iron door for access from one space to another; and the fire-walls must run at least 6 inches above the roof-timber. The latter are not permitted to connect with each other or rest upon this fire division-wall. Each house must be supplied with water, either by means of a well in the court-yard or by public water-works. No sub-cellars or sunk basement can be inhabited unless its ceiling is at least 4½ feet above the sidewalk. No ground or parterre floor shall be less than 6 inches above the pavement. All stairs and connecting corridors and halls giving access to the various tenements must be fire-proof, either of stone, brick, or iron. Main stairs are not to be less than 3½ to 4 feet in width, and the steps must not be less than 11 inches in width or more than 6 inches in height. Stairs opening on a well-hole must have a guard-railing of at least 3 feet in height, and *the top rail must be guarded against accidents from children sliding down on them by ornamental knobs or projections placed every 3 feet apart.* This is a simple and very effective safeguard against some of those dreadful accidents which so frequently happen. The height of any story shall not be less than 9 feet in the clear.

25. The division-wall between chimney-flues and any wood-work shall not be less than half a brick, or six inches; and, in addition, a brick tile on edge shall be laid between the chimney-wall and the wood-work, so as to cover the joints between the brick. The flues must be well plastered, both inside and outside. Chimney-flues are of two kinds: either the wide flue for the passage of chimney-sweeps, 18 inches square, or the narrow or Russian flue, of not less than six inches square for one fire, or six by nine inches for two fires. Flues should be as nearly as possible perpendicular, but should in no case be drawn more than at an angle of sixty degrees with the horizon. No wooden cornices are allowed. They must be either of stone or brick, or of cast or galvanized iron. Roofs must be covered with tiles, slate, or metal, and snow-boards must be provided. Wooden subpartitions of rooms may be used, if well plastered on both sides, but they are only used in very inferior buildings, and are generally half a brick or six inches in thickness, resting

on a rolled-iron beam where there is no corresponding support below. There should be one water-closet for each tenement, of not less than two feet nine inches in width, with good light and ventilation, and having a large ventilating-pipe carried up through the roof. Where public sewers pass through the streets, a private sewer of brick, oval in shape, of at least two feet in width and three and a half feet in height, must be laid in cement-mortar and connect with the former. It should also be ventilated by a large pipe passing up above the roof.

26. No outside steps should project beyond the building-line; and no projections of bases or of the fronts for architectural features or shop-windows of stores should exceed nine inches. Balconies and bay or oriel windows should never project more than four feet, nor exceed the length of one pier and a window's width, nor be less than nine feet above ground, and nine feet in distance from a neighbor's house. They should not be placed in a street of less than forty-eight feet in width. A special permit is required for them. The kitchen-hearth should be of brick or stone for at least 2 feet in width outside the fire-place. Corridors should be not less than 4 feet in width, and made of stone or arched in brick. The windows are always furnished with double sashes, and are generally made in the French-easement style, opening like folding doors at the center. The outer ones in the old style open outward, but in consequence of the occurrence of many accidents, the new law obliges them to be made to open inward, like the inner pair; and this occasioning some inconvenience in the fastening back and in their use, the American sash or hoisting window has lately come into use. Still they are used double, saving a large amount of fuel in winter and dust and heat in summer.* The doors are generally double or folding doors, opening at the center, one half generally fastened and the other free for ordinary use. They are very convenient, and project thus much less into the room. In large houses with very thick walls, the half wing of such a door is generally covered by the thickness of the wall. The kitchen floors are often completely tiled with stone, marble, or encaustic tiles. The floors of the best rooms in most houses, both old and new, are laid with parquetry square tablets of hard variegated wood, such as oak, ash, walnut, or mahogany. They are sometimes still further enriched by inlaying with other costly woods. They are tongued and grooved together, and laid on a soft pine or blind floor. They are waxed and polished frequently and quickly by regular polishers, who keep these floors in order, receiving pay by the year.

27. Earthenware or porcelain stoves are invariably used for heating apartments. The fire-door or heating-place for the best rooms generally opens upon some outside corridor, passage, kitchen, or inferior room. The stoves are frequently set diagonally across a corner of the room, and thus do not take up much space, large as they are. They are frequently of the size of a book-case, and much higher than the modern ones. They are generally ornate, and are sometimes of very rich and

* In summer, the outer windows are frequently unshipped and stored.

artistically-decorated patterns. They certainly give out a very pleasant and uniform warmth, and when once the fire is made it lasts through the day and late into the night, having all the uniformity of a bake-oven. Indeed these stoves somewhat resemble the oven, as inside the outer or ornamental shell there is a heavy lining of brick and clay. This is protected by a grating against injury from careless handling of the fuel. Through this structure the flues wind around with many turns until the smoke, before reaching the chimney, has parted with all its available heat. The heat is retained for a great length of time by the brick and earthenware of the structure. Thus there is neither the scorching heat of an iron stove nor the sudden fluctuations and extravagant waste of an open fire-place; and, where fuel is as costly as in Vienna, these stoves are valuable for their economy.

28. Before commencing a building, a permit must be obtained by placing a copy of the plans, sections, and elevations in the hands of the municipal building-commissioner, to be approved and signed by him. After these plans are examined and approved as in conformity with the existing building-laws, no deviations are allowed without special notice to the proper authorities. The building and the materials used are constantly and strictly inspected by the inspector of buildings, and an *injunction* is quickly served if bad material is employed, the plan altered, or any building-law infringed. No newly-finished building can be occupied until inspected and approved by the proper authorities as of safe and proper construction, as well as perfectly dry and as complying with all sanitary regulations. In matters of taste in the external decoration or design of a front or façade of a new building the government retains supervising power. Elevations are to accompany the plans, and, although in regard to architectural style there are no positive regulations, yet the proper authorities suppress or modify a positively ugly exterior, at least in so far as it would offend public taste.

29. This report on the construction of the dwellings of Vienna cannot be more appropriately closed than by a brief description of two kinds of what may be termed self-supporting brick arches, which are constructed in Vienna by the skilled masons *without the use of centering or any temporary supports during their construction*. They are only used in Austria, and they show not only the great skill and dexterity of these masons, but such a mechanical knowledge applied to construction as is nowhere else applied to the same purpose. This construction of arching self-sustained during construction no doubt had its origin years ago under the old building-laws, which required all of the apartments of a ground-floor or parterre to be arched. As that floor contains generally not only lodging-rooms, but offices and fine stores, the desire naturally arose to produce as light-looking, flat, and pleasing an arch as could be safely constructed before iron beams and girders came into use, avoiding the heavy and clumsy-looking barrel and gothic arches for low-pitched ceilings, as well as the great expense of centering during their

construction. There are two kinds of these so-called "*Platzel-gewölbe*"—*flat self-sustaining crown-arches*. The *self-sustaining* feature consists in its power of supporting itself during construction without centering. One of these arches is called the "*Welsh*," and the other the "*Bohemian*." Why *Welsh* we have not been able to ascertain, but the "*Bohemian*" arch, we have been informed, originated in the kingdom, now the province, of Bohemia, and was originally designed and introduced by the very skillful masons of that country, who still preserve their peculiarities of practice, both in Prague and in Vienna.

Front and rear walls being constructed, and the building in the rough entirely put up and roofed in, cross-girder arches, (called *gurten*,) really brick girders in the place of the present iron ones, are thrown across the rooms to be arched. These cross-girder arches are generally two bricks in width, and one and a half to two bricks in height at the center. The footings or abutments are always carried up with the construction of the regular walls until they project one and a half bricks beyond the inside face of the walls. These cross-girder-arches are afterward completed on a regular centering of wood with a groove of about $1\frac{1}{2}$ inches in depth on their sides for the support between three of these flat-crown-arches. The same depth of curved groove is also cut in the front and rear walls (following the shape of the curve of the arch) while constructing. For the "*Welsh arch*," the girder-arches are generally placed at the center of each pier between two windows, being from 10 to 12 feet apart. The *Welsh arch* is never used over that width, but may be of the full length required by the depth of the room, although not usually over 18 to 22 feet in length. It is a favorite arch for halls and entrance-passages not exceeding that width. For the "*Bohemian*" arch the girder-arches are generally placed at every second pier of a room, say 16 or 18 to 20 feet apart, corresponding to the width, or rather to the depth, of the room. In all cases these arches are used in square apartments, or as nearly square as they can be arranged. Through the girder-arches run strong lock or anchor irons, to guard against the pressure on the sustaining-walls. The "*Welsh*" arch is segmental in all directions; the "*Bohemian*" is a spandrel arch, or dome, growing out of a square apartment. The courses are laid in the form of circular arcs, commenced in the corners, and curved and declining toward them. In either of the two methods, every course of the arch laid in this way without a centering is really complete and self-sustaining, very nearly as much so as if the whole of the vault were finished and finally closed. The spandrels, particularly at the commencement of the *Bohemian* arch, are filled up solid for about one-third or one-fourth of the size of the vault. Both kinds are closed with half a brick or six inches thickness at the crown or center. The sole guide for the mason is the curve and nosing-line on the wall and girders, and a center-pole or other mark for height set up for the closing-point at the crown. The rest is all guided by the practiced eye of the workman.

The rise of the "Welsh arch" is generally one twenty-fourth the span. The "Bohemian arch" is also very flat at the crown as compared with a full center hemispherical dome. The Welsh arch is generally commenced by one mason at each end; the "Bohemian arch" by four masons, one in each corner, until the corners meet, and they are then completed by two, of whom one finally goes on top the yet incomplete arch and hands in the materials, while the other one, in the central hole below, attends to the setting and the eye-line of the courses. These men are so skilled and practiced in their trade that they hit by the mere use of the eye the true lines of the proper curves, as perfectly as if they were guided by a pattern or centering, and attain the closing-point at the crown with the utmost precision. Very rich mortar is used for these arches. Each brick of a whole course has to support itself, and skill in the mechanical manipulation consists in keeping every course to its proper and unbroken curve in every direction, and the courses at the proper dip to the plan, as well as in applying and bedding the brick in its proper place at once, by merely rubbing it as it were into its bed and into position, never *knocking* it up or down, or back and forth, by the use of a hammer, and thus breaking and disturbing its bond or adhesion to the mortar. As surely as this is done, or the curve-lines crippled, the whole will come down after six or eight courses more have been applied at the very point at which those disturbances occurred. These arches are often finished with different-colored bricks and with pointed joints without plastering, to show the beauty of their mechanical construction. This is seen in many old buildings and in the corridors and entrances to the new arsenal and other "*rohbau*" ("unplastered or raw brick.") The plans and sections, Plate XI, will show the general principle of these ingeniously-constructed arches.

CHAPTER III.

ARCHITECTURAL FEATURES OF DWELLINGS.

ARCHITECTURAL DEVELOPMENT DATING FROM THE THIRTEENTH CENTURY; FEW EXAMPLES REMAINING; REIGNS OF JOSEPH I AND CHARLES VI; EFFECT OF FRENCH WARS; IMPULSES GIVEN IN 1845 AND 1857; INFLUENCE OF THE DECREE OF 1857; BENEFIT OF POPULAR INSTRUCTION; SKILL OF VIENNESE ARTISANS; BEAUTY OF NEW PUBLIC BUILDINGS.

30. We cannot but admire the architecture and the embellishment of the new dwellings in Vienna, and give due credit to the architects of that city for the great advance which has been made during the past twenty-five or thirty years, particularly after the political changes of 1848, and since the new impulse was given to building after the demolition of the old fortifications and the enlargement of the city by the incorporation of the formerly outlying thirty-four suburbs with the central or old city. The history of the development of architecture in Vienna can only be traced back through its remaining monumental buildings as far as the thirteenth century. Of the Roman period there remain only two examples, and these are of the time in which the Gothic style had already obtained the preference. They are the western façade and turret of the Cathedral of St. Stephen's, and the nave and transepts of the Court Church of St. Michael's. More abundant are the remaining evidences of the building activity and architectural development of the Gothic style in the fourteenth century. The fine chapel of the Knights Templars of the Teutonic Order, the St. Augustine and Minorite churches, the nave and choir of St. Maria on the Stairs, the tower and choir of St. Michael's, and the apsidal choir and the incomparably beautiful tower of St. Stephen's are illustrations of styles which left their impress also on the private dwellings of that and the following period in the many steep roofs and gables, projecting oriels and turrets. Vienna is under small architectural obligation to the renaissance period, as, after the first siege of the city by the Turks, the whole energy of its people was expended in the improvement of its fortifications, and in more peaceful times taste in art was principally directed by the leading fraternities of religious orders, who, in their numerous new church buildings, restorations, and remodelings, often produced depressing combinations of styles, either too plain and sober or too showy and pretentious.

31. During the reigns of the Emperors Joseph I and Charles VI, another impulse to the building-arts was given by the examples of their luxury and splendor-loving nobles and the princees of the empire, led

by that great patron and admirer of the fine arts, the celebrated Prince Eugene of Savoy, who, by the erection and embellishment of palaces and public buildings, ably seconded by the talent of their celebrated architect, Fisher of Erbach, produced such fine works as the Charles and St. Peter's churches, the imperial summer palace at Schönbrunn, the imperial winter riding-school, the court library, and many public offices. The palaces of Prince Engien, Trantson, Mannsfield, Auersberg, Lichtenstein, Schwarzenberg, Daunish, and Kinsky, the celebrated "Belvidere," and numerous other equally splendid buildings of the times. But the disastrous and long continued French wars, from the very beginning of the nineteenth century to the fall of Napoleon, and the Hungarian, Italian, and other provincial troubles during the remainder of the first half of that century, and up to the final political changes in 1848, had retarded, nay paralyzed, all the industrial and fine arts in Austria, as well as in the rest of Continental Europe. The little of what was done during that period in domestic architecture was made up of bad imitations of debased Italian and servile copies of poor examples of French and Belgian style, derisively, but not not inaptly, designated by the fun-loving art critics of the times as "the curly wig and queue style," on account of the many unmeaning twists and turns of design, meant for ornaments, or introduced as so-called architectural features. The development of native talent and taste in arts were also much retarded during that period by the old system of bureaucracy, in which councillors, superannuated and incompetent directors, assumed the control of the public taste, affording no opportunity for the exercise of individual talents.

32. But after the displacement of this old depressing system, and after the call of the talented and eminent architects Vandernüll and Sicardsburg to the head of the Vienna Academy of Fine Arts in 1845, and with the enlargement of the city, and the establishment of schools of design and industrial and technical institutes, museums, art schools, and by the energetic and praiseworthy exertion of the Engineers and Architects' Association, a new and well-directed impulse was given to the industrial arts, and that of architecture in particular. It was greatly aided by the imperial decree promulgated in October, 1857, directing the erection of great public works and improvements on a grand scale. The adoption of a wide Ring street around the inner city and improvements after the example of those of Paris were contemplated, the erection of two new museums for art and natural history collections, an exchange, new parliament houses, and a grand university building, a new "Rath-house," (city hall or hotel de ville,) an imperial theater, extensive improvements and additions to the imperial palace, a palace of justice, the new opera-house, and many others were projected, for which either select, local, or general competition among architects was invited and the designs of native artists received the principal premiums.

33. These were enterprises of such importance and magnitude, that

their execution, under favorable circumstances, within the next ten or twenty years, will mark this as a grand epoch in architecture. These works, which are put into the hands of the most worthy masters of their arts, will add a luster to the times, and magnificence and dignity to the great imperial city of Vienna. Several of these works have already been commenced; the designs and models for all of them are prepared and approved. The fondness for the Gothic style for ecclesiastical structures, which has been kept alive by grand old examples, and nourished by the continual repairs, and the finally thorough restoration of that splendid example, the southern tower, and western façade, and gable of the church of St. Stephens, was in later years followed by the erection of the rich Imperial Votive or Memorial Church, the new Lazarite, Elizabeth, and several other conspicuous church-structures in that style. The new Hotel de Ville is also now building in tastefully enriched Italian Gothic. In many of the proposed new public buildings above mentioned, the Italian renaissance style is predominant, while the French renaissance, or louvre style, is only shown in more isolated examples. Although for private dwellings a so-called general eclecticism exists here as elsewhere, there is an acknowledged predilection toward the vigorous and massive forms of the Italian renaissance in preference to the elaborate and lighter, but therefore probably more effete, French school of architecture.

All of the afore-mentioned causes of building impulse, seconded by these projected designs for the erection of public works, had also an invigorating and salutary influence on the architecture and embellishment of private dwellings, and one of the first and best examples of the successful reconciliation of tasteful architectural embellishments with the demands of practical wants and domestic usefulness is perhaps the new group of buildings called "Henry's Court," the apartment-houses already alluded to under the head of plans and constructions.

It has since that time become almost a point of honor with owners and architects to give the façades of new private dwellings more or less rich architectural embellishment. Although they may appear sometimes overdone, or in want of harmony with their frequently very economical and consequently meager internal finish and arrangements, yet we find many tasteful improvements among the lately erected dwellings. Since the renewed vigor of the many powerful and energetic building associations, who avail themselves of the best constructive and architectural talent of the country, a large number of palatial group or block buildings have been erected in that impressive Italian renaissance style, which gives to the new Ring street more the appearance of a street of palaces than of dwellings or apartment-houses. It is worthy of this great city, and its equal can rarely be found elsewhere. The great Italian cities, in their most flourishing periods of architectural grandeur, did not excel it. It is true that there may be, in some portions of the new Ring-street, a little too much uniformity, but this is well compensated by the large number of independent prominent private

dwellings and real palaces, such as those of Grand Dukes William and Ludwig Vietor; of the Duke of Württemberg, now the Hotel Imperial; the palaces of Todesco, of Epstein, and of others; the Grand Hotel, the Hotel de France, Hotel Austria, Hotel Britamia, Hotel Metropole, Hotel Donau, and many more.

34. This gratifying advance, not only in the higher or so-called fine arts, such as architecture, painting, and sculpture, but in the industrial, technical, and mechanical arts and the trades connected therewith, within the last twenty-five or thirty years, is evidently mainly due to the establishment of many schools and educational institutions on a popular and economical scale, which are accessible to the humblest and poorest in the land for a small compensation, and often entirely free of charge, where all the elements of industrial knowledge, up to the highest branches of art-culture, are taught, and where the students are guided by the ablest professors, and their equally well qualified and competent assistants, and senior pupils—the latter of whom thus are not only teachers, but are executors of both public and private works. Thus the professors of the academy of fine arts furnish architectural designs. Professors of painting and sculpture, with their advanced pupils, execute work on public and private buildings of the empire, in addition to that done by regular practitioners of those arts.

But the artisans also, the masses engaged in mechanical occupations, have derived great benefit from being taught the art of drawing, not in its aesthetic sense only, as relating to forms of beauty, but in its technical sense, as enabling them to understand a drawing and to execute the work by the aid of the graphic plan alone; and they are taught in a practical manner so that they can execute these drawings themselves. They are thus able to dispense with the aid of models, which previously could be furnished only by a few cultivated experts. Now, every instructed and skilled artisan being competent to work from designs furnished him, or to furnish and execute them himself, with only occasional finishing-touches by the professors of the arts, these economical and tasteful architectural embellishments of dwellings have become the rule instead of the exception. We thus find the skilled mason and stucco-worker of the present day executing any design laid before him. And so with the house-painter, the carpenter, the cabinet-maker, the stone-cutter, the smith, the worker in any wood, mineral, or metal.

35. The Viennese thus get their architectural details well and economically executed by artisans, their designs furnished by competent architects, their sculpture done in any material in an artistic manner, and their house-painting either in plain and tasteful style by the skilled workman or in the highest style of art by numerous professional artists. Every one of their better class of dwellings is now designed and executed with a tasteful façade, and they are often enriched with considerable architectural embellishment, and sometimes with sculpture executed in stone, cements, or terra-cotta; entrance-halls, public or grand

stairways are furnished in the same manner, and often further enriched by seagliola or real and variegated marbles on the walls and frescoes on the ceilings. The walls and ceilings of the living and social rooms in their dwellings are always painted, at least in plain and tasteful water or encaustic colors, and are often embellished by works of artists in fresco and oil painting. They are thus enabled to produce their present and their best style of buildings by the combination of the three sister arts of architecture, painting, and sculpture, giving these buildings a harmonious and finished appearance, totally unattainable with the mere meager architectural composition and execution such as is seen in less favored countries. Drawing has been incorporated, for at least forty years past, as a useful and necessary branch of common education in the ordinary and high schools. It has been considered as indispensable in the school system as grammar, reading, and writing, and the masses have reaped as much benefit from the former as from the latter. The public taste has been vastly improved.

36. I cannot close this paper on the construction and embellishment of dwellings without expressing my admiration of that splendid product of architectural skill and artistic embellishment, the new opera-house, and of several of the lately erected new theaters, as well as of the grandeur and palatial magnificence of the new railway-stations. The "Staats-bahn" and New Southern stations especially are structures which, in their tasteful designs and richness of embellishment have not thus far been equaled in any part of the world.

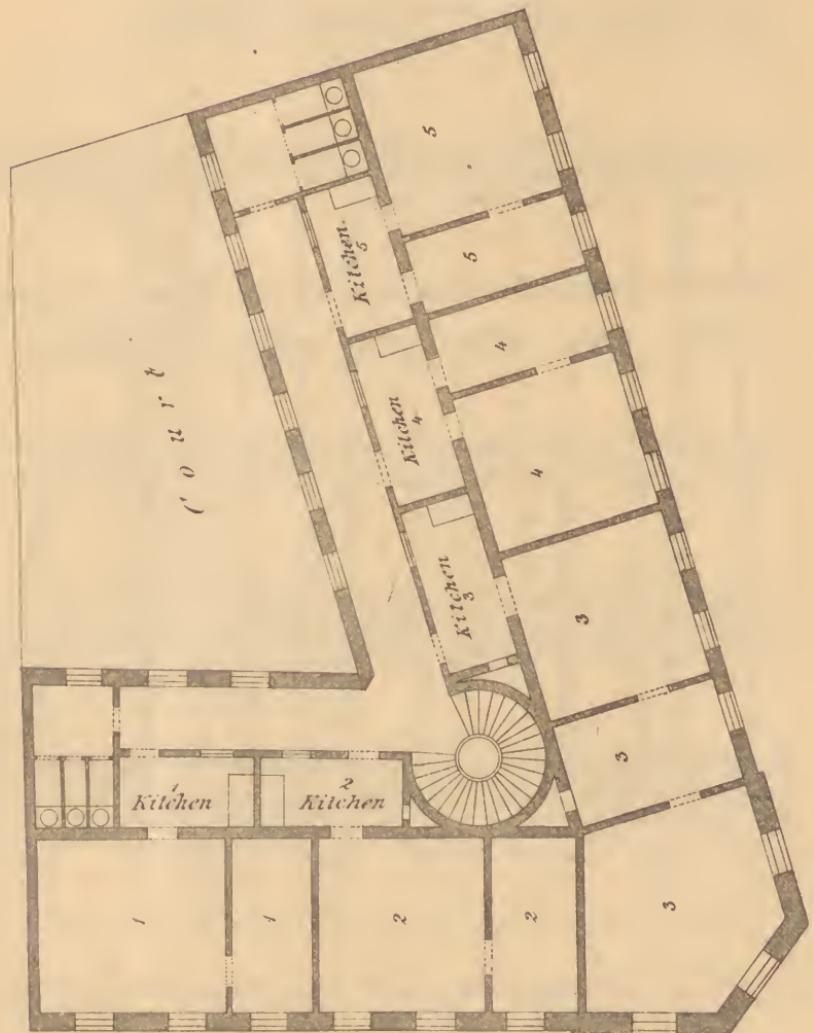
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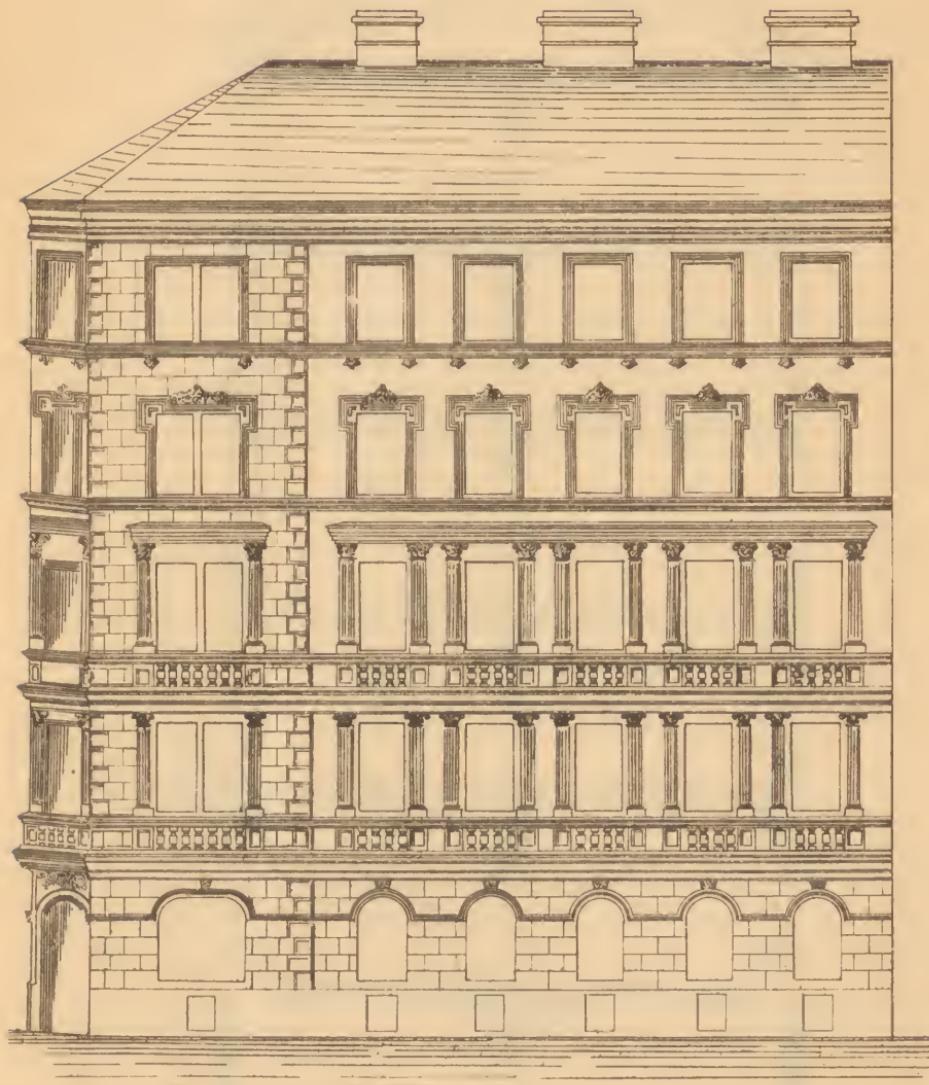


Plan of Principal Floor of small Apartment House,
Vienna.



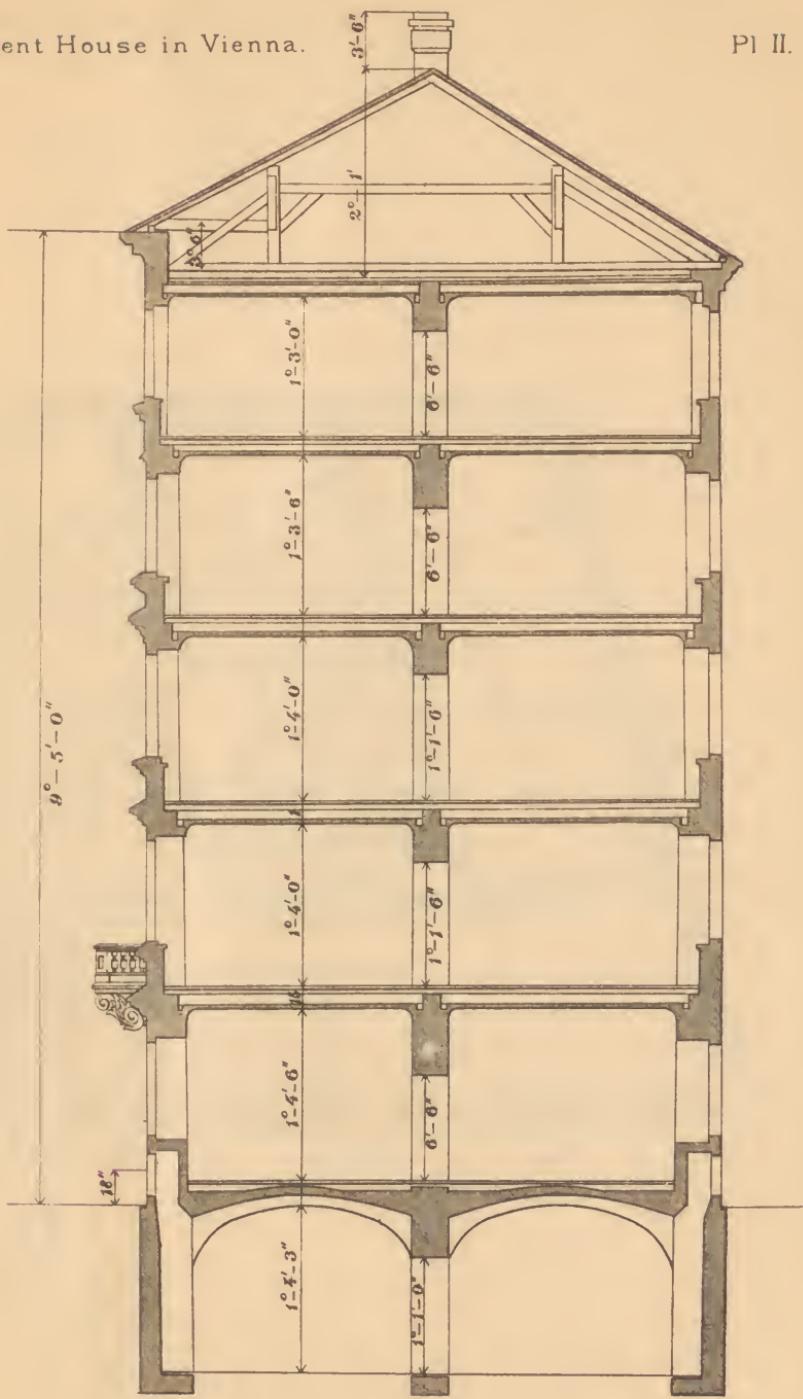
Apartment House in Vienna.

Pl. II. (A.)



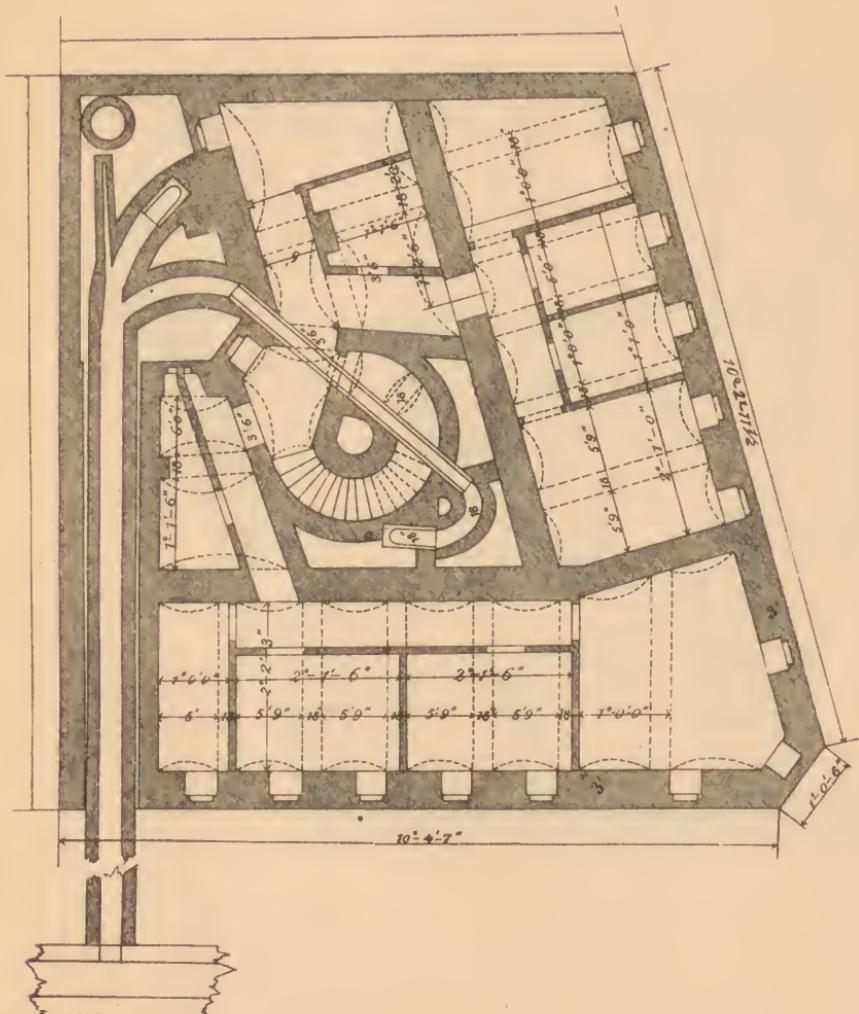
Apartment House in Vienna.

Pl II. (B.)



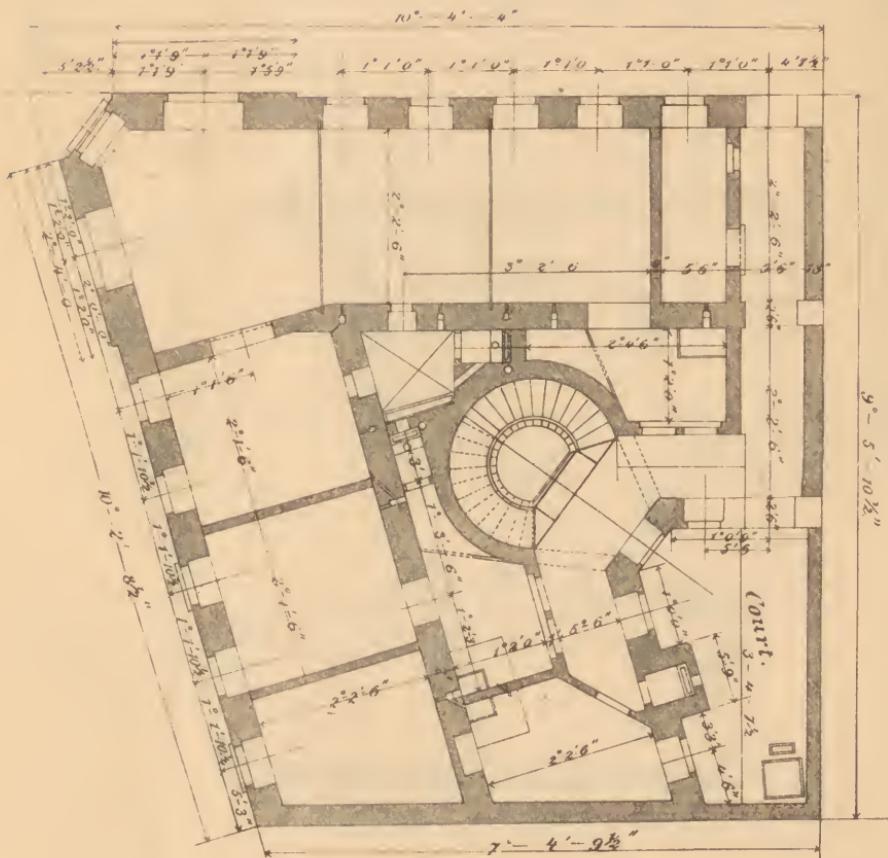
Apartment House in Vienna.

Pl. II. (C.)



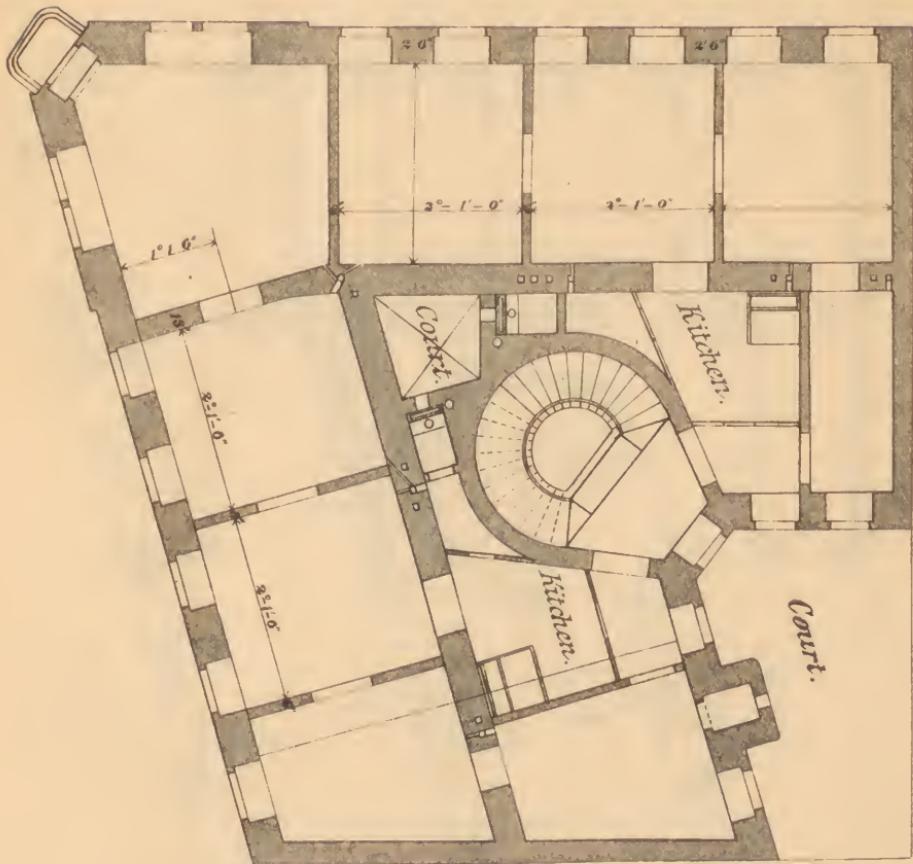
Apartment House in Vienna.

Pl. II. (D.)



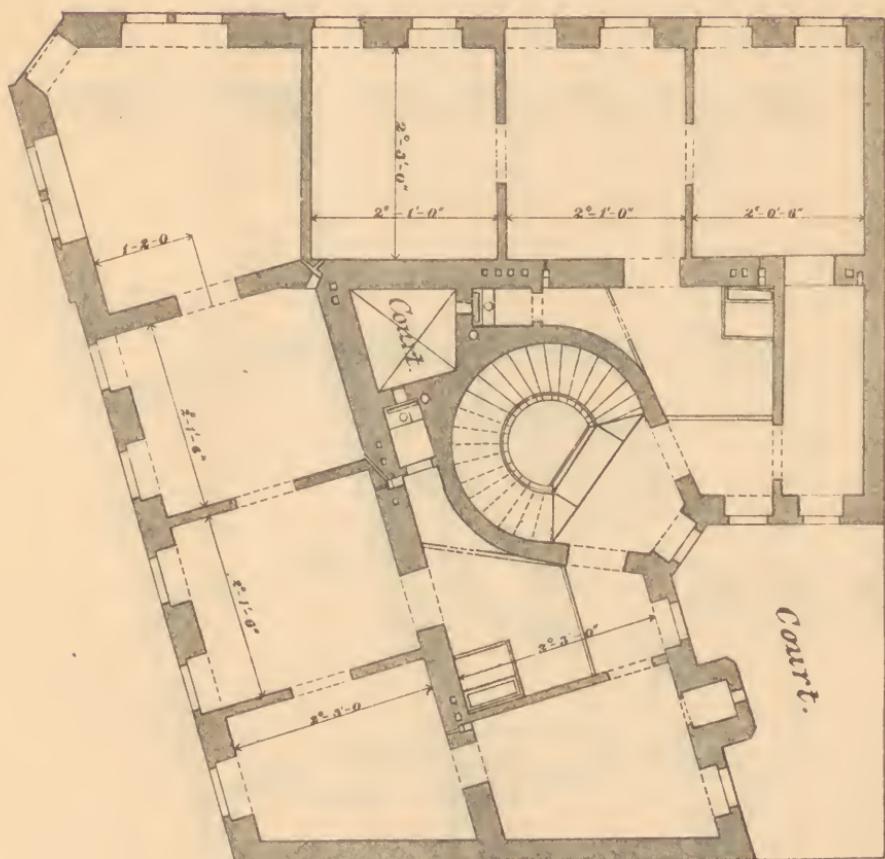
Apartment House in Vienna.

Pl. II. (E.)



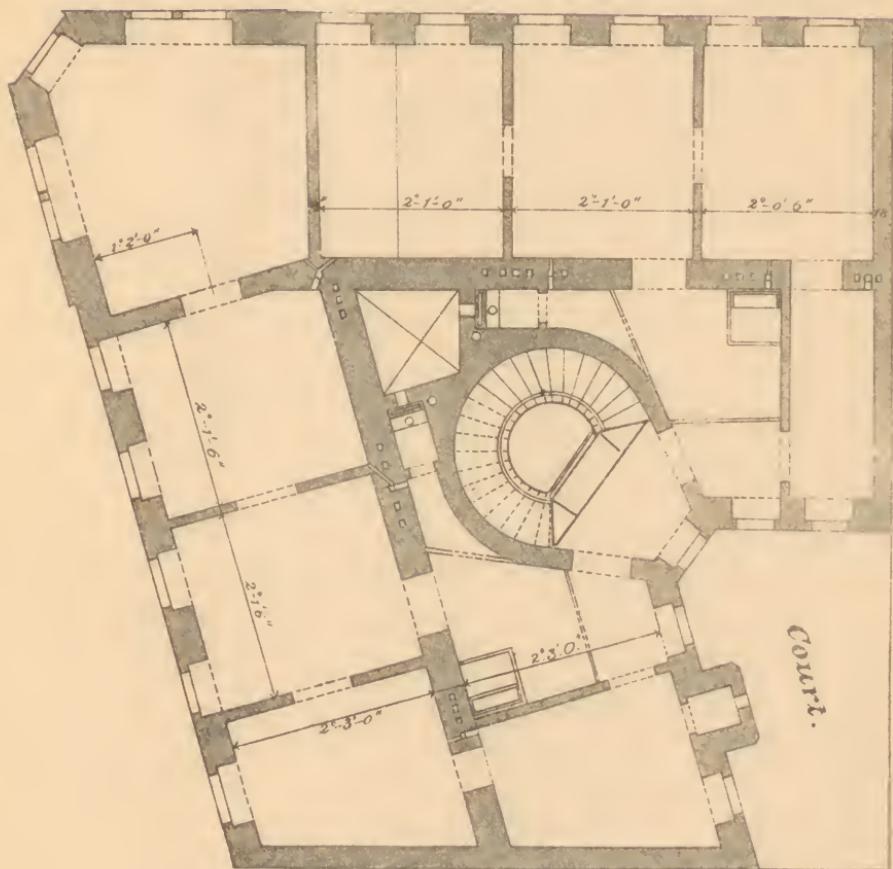
Apartment House in Vienna.

Pl. II. (F.)



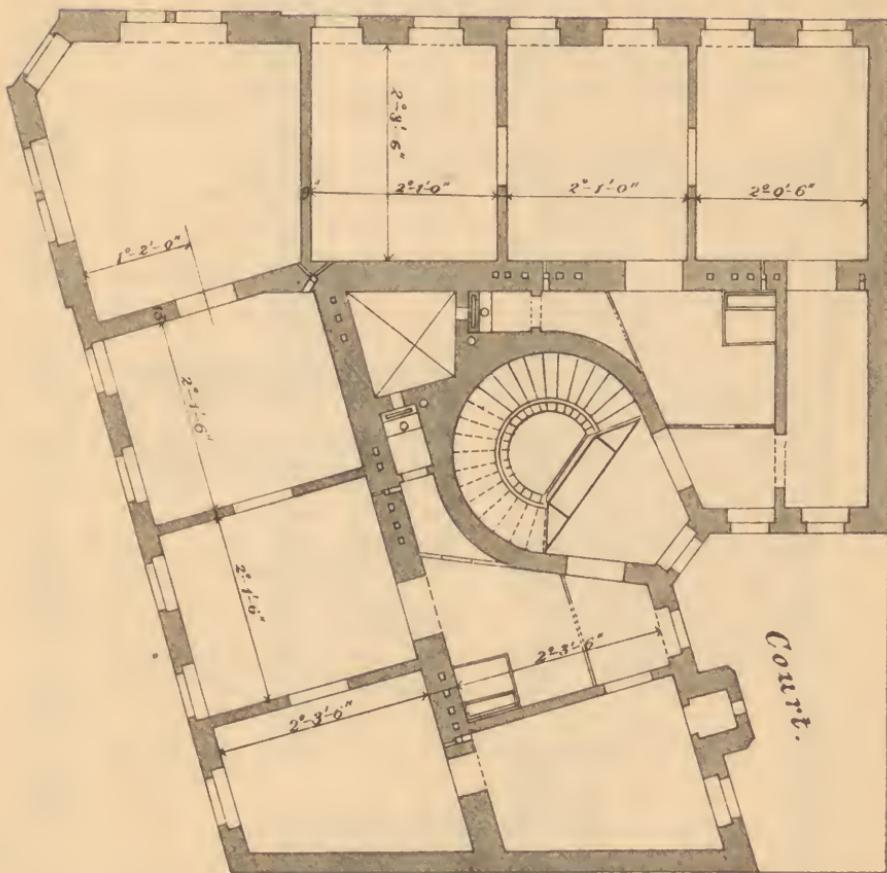
Apartment House in Vienna.

Pl. II (G.)



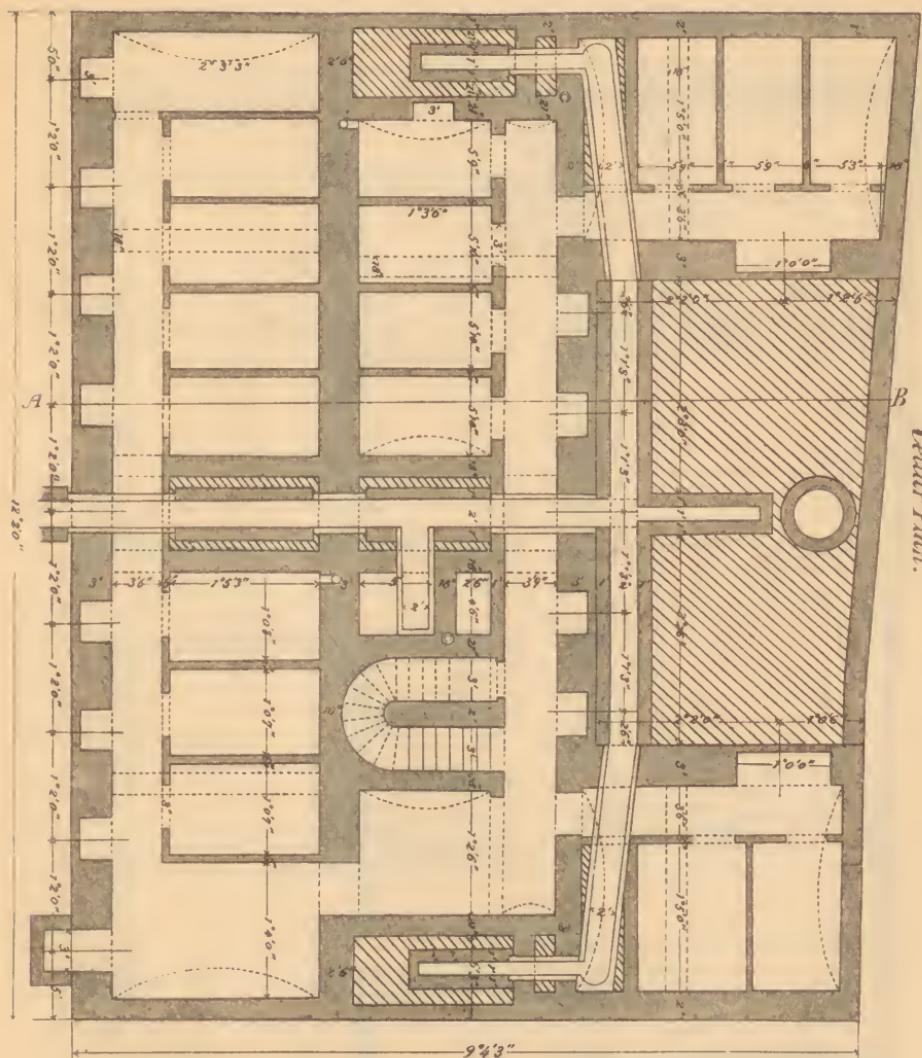
Apartment House in Vienna.

Pl. II. (H.)



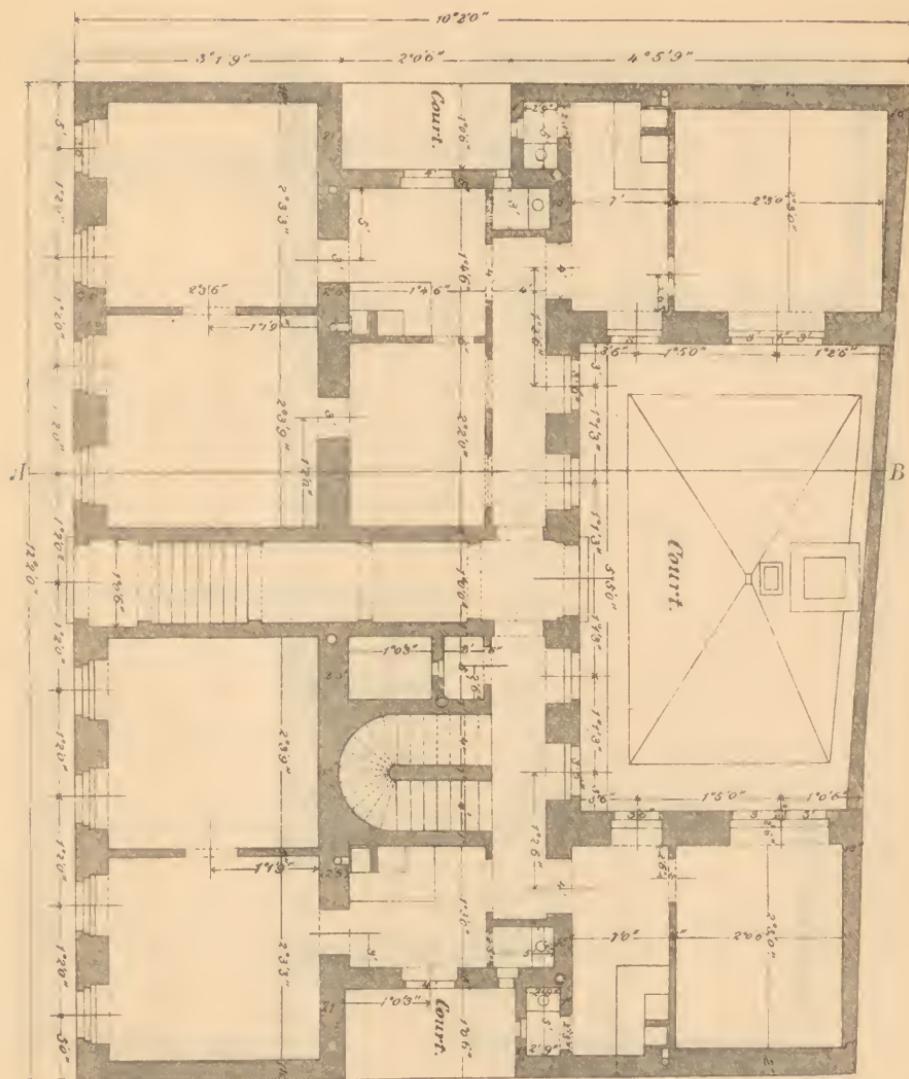
Apartment House in Vienna.

Pl. III. (A.)



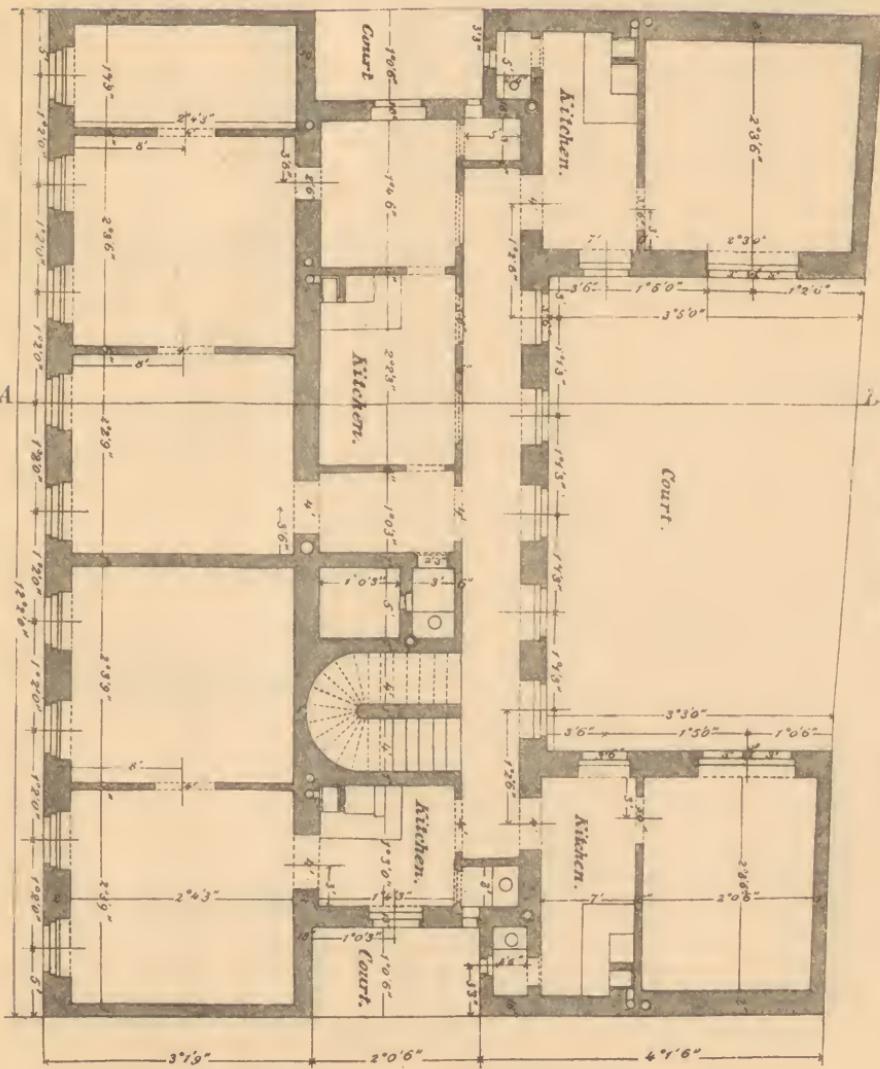
Apartment House in Vienna.

Pl. III. (B.)



Apartment House in Vienna.

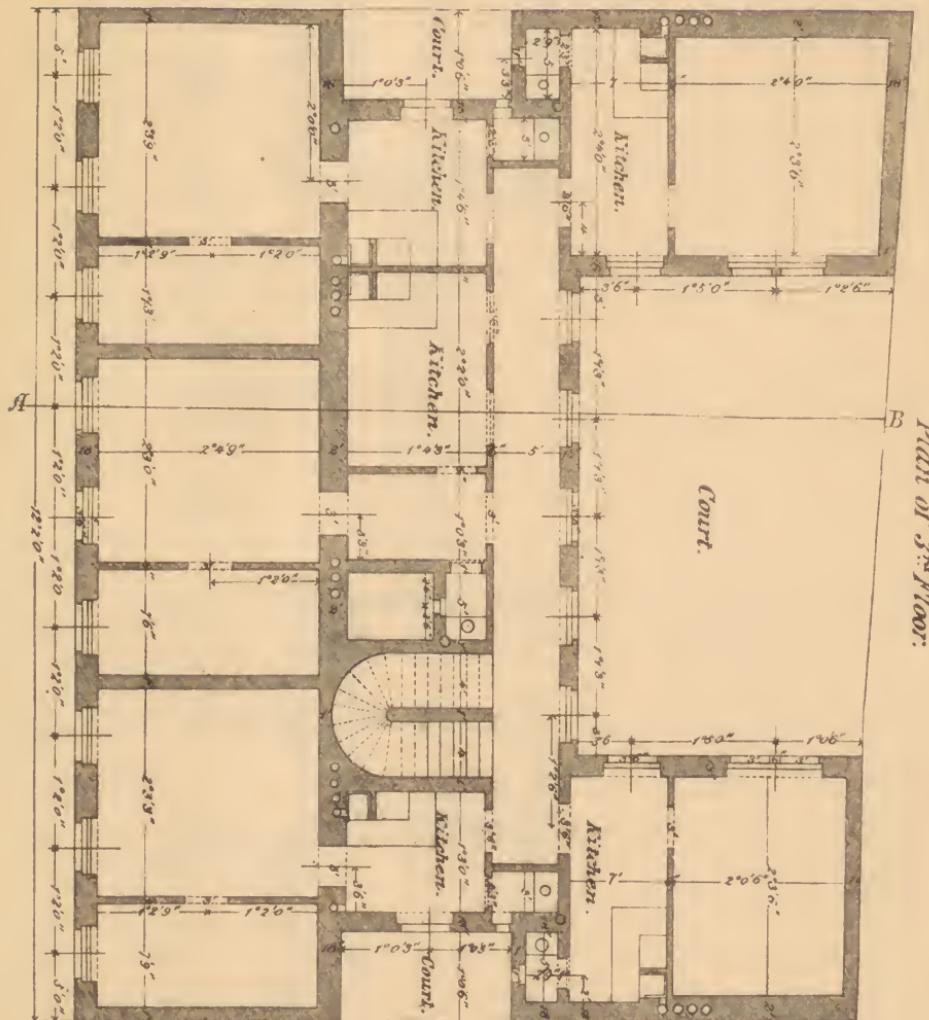
PL. III. (C.)

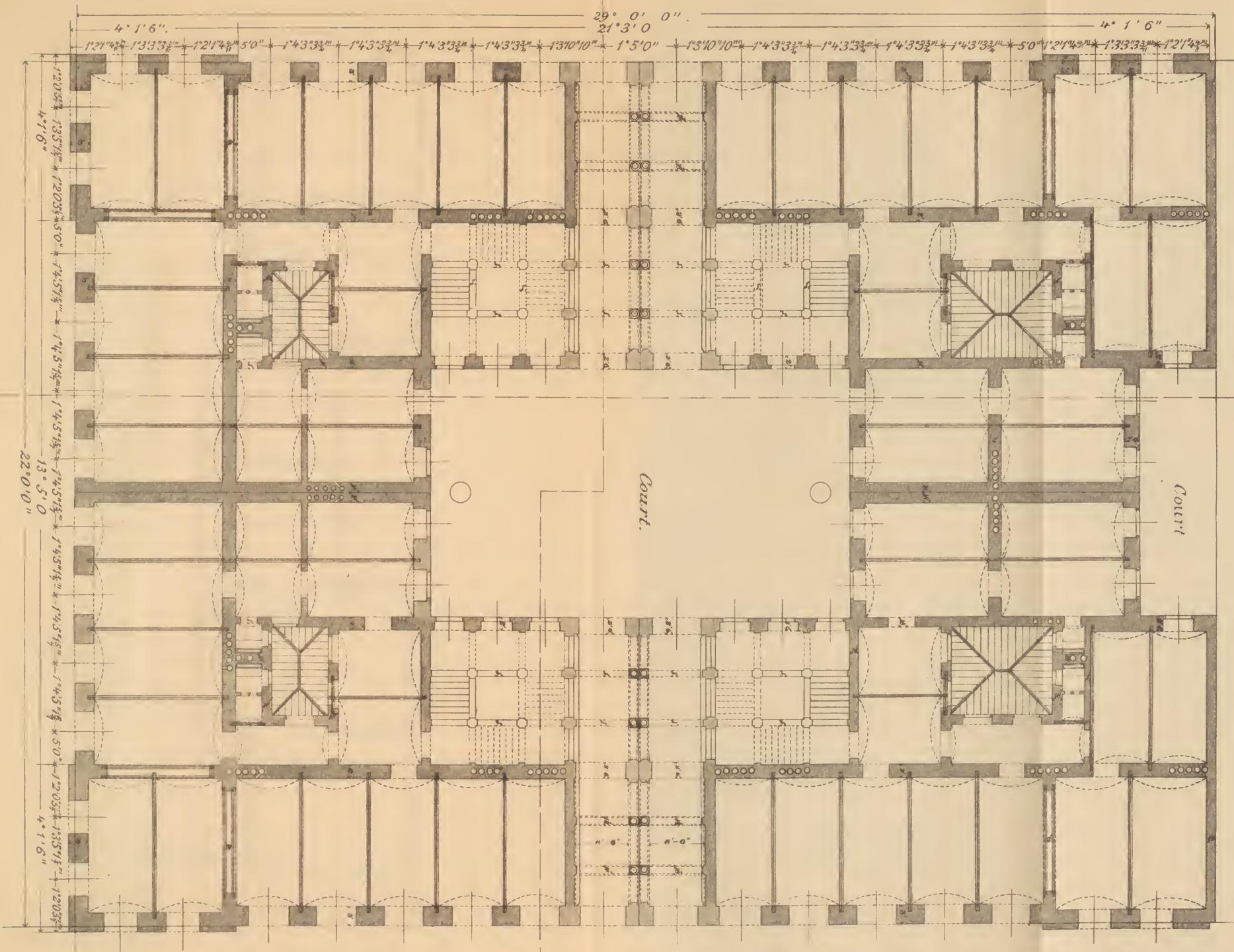


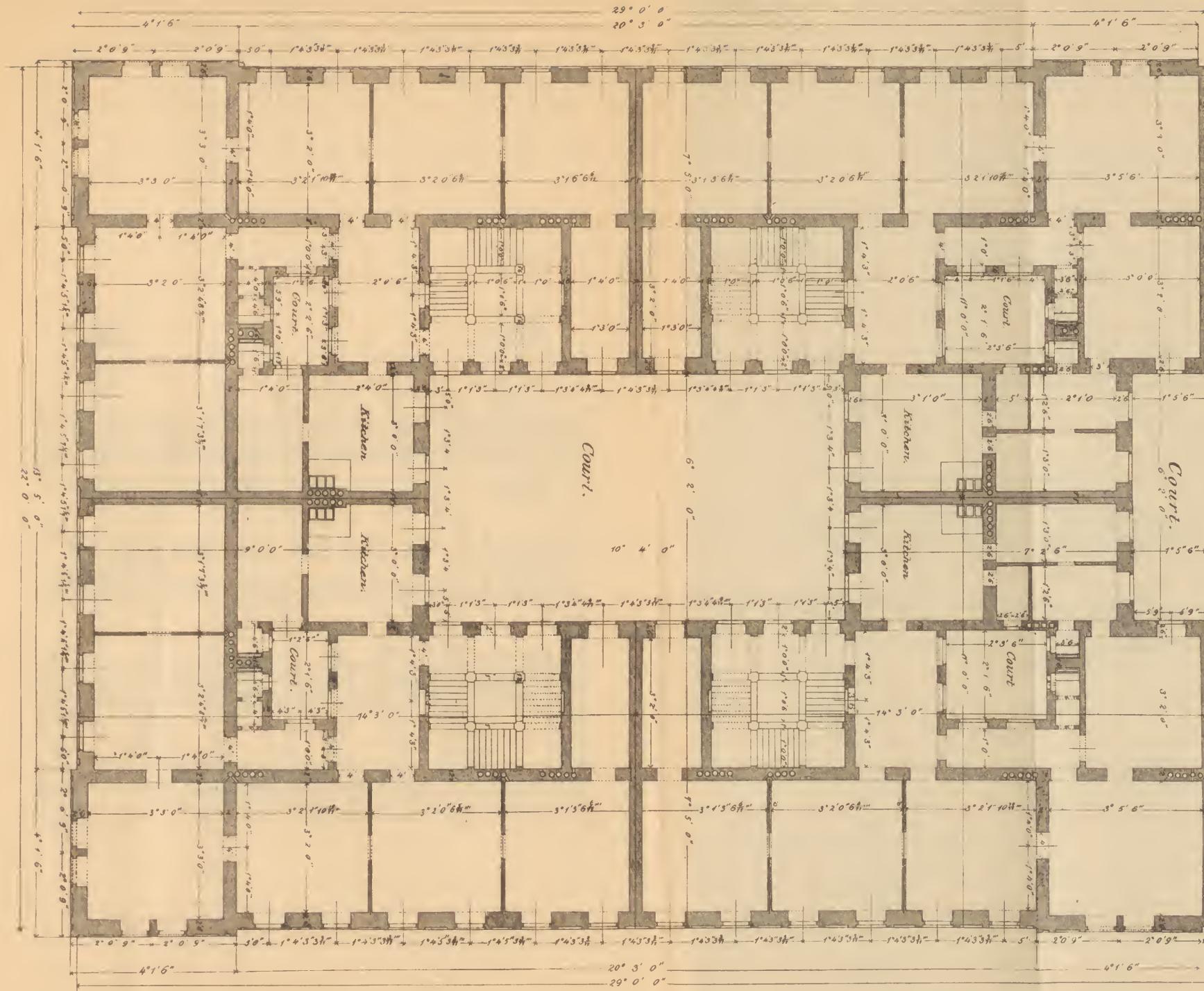
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Apartment House in Vienna

Pl. III. (D.)

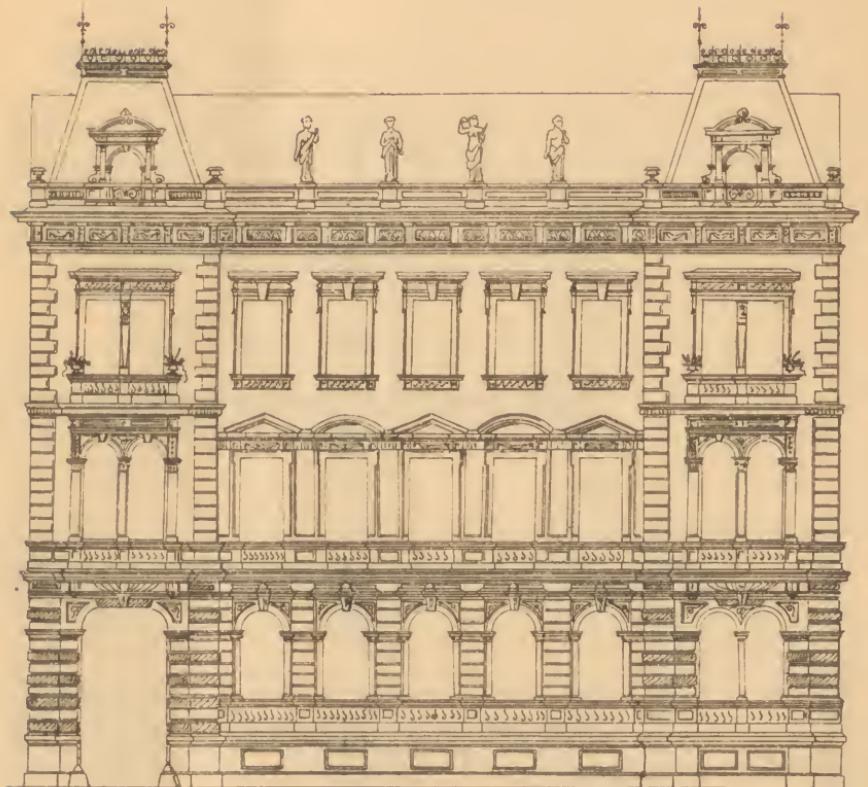






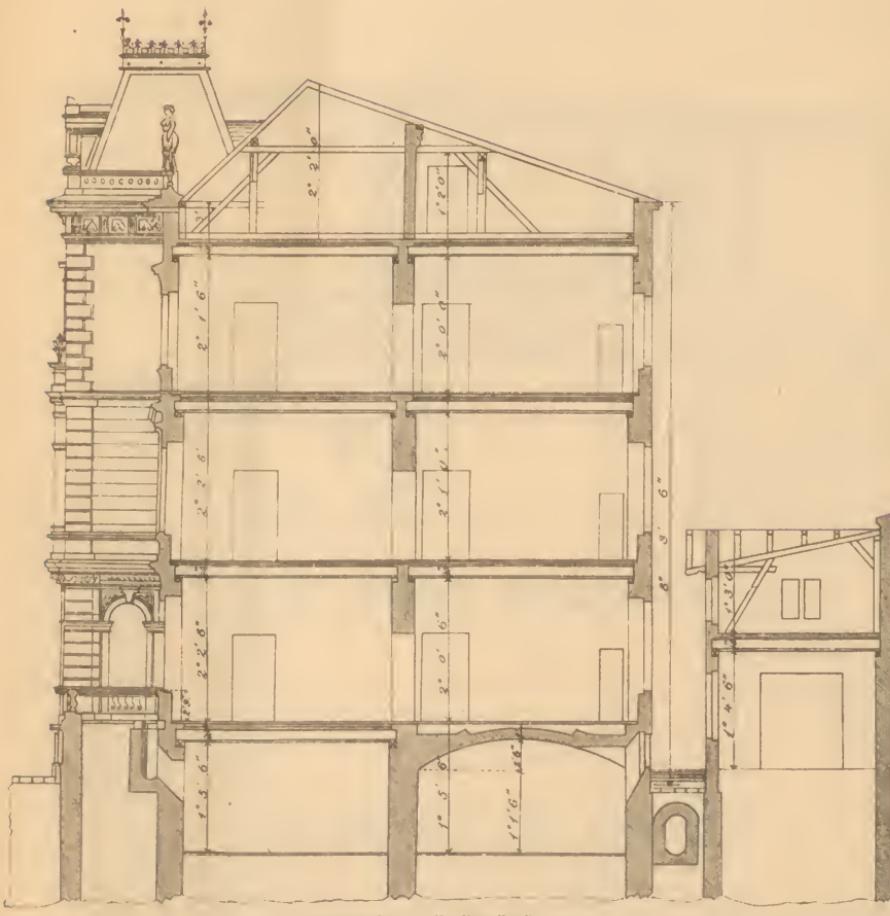
Apartment House in Vienna.

Pl. V. (A.)



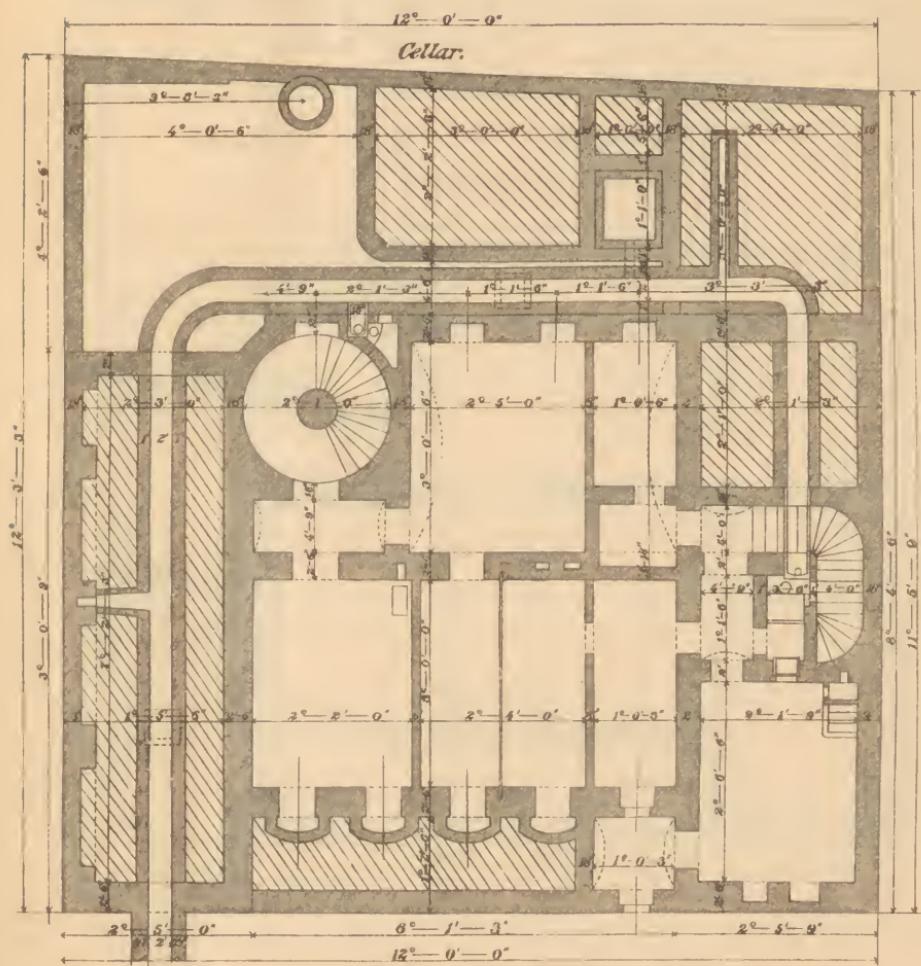
Apartment House in Vienna.

Pl. V. (B.)



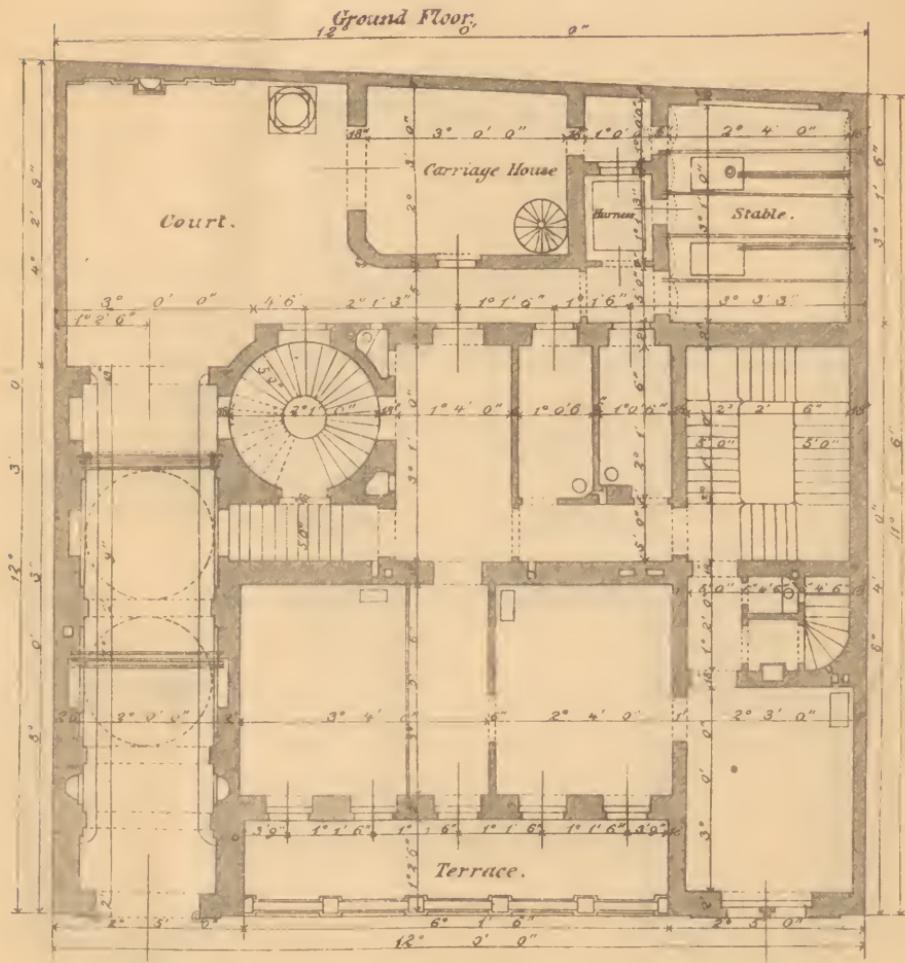
Apartment House in Vienna.

PL. V. (C.)



Apartment House in Vienna.

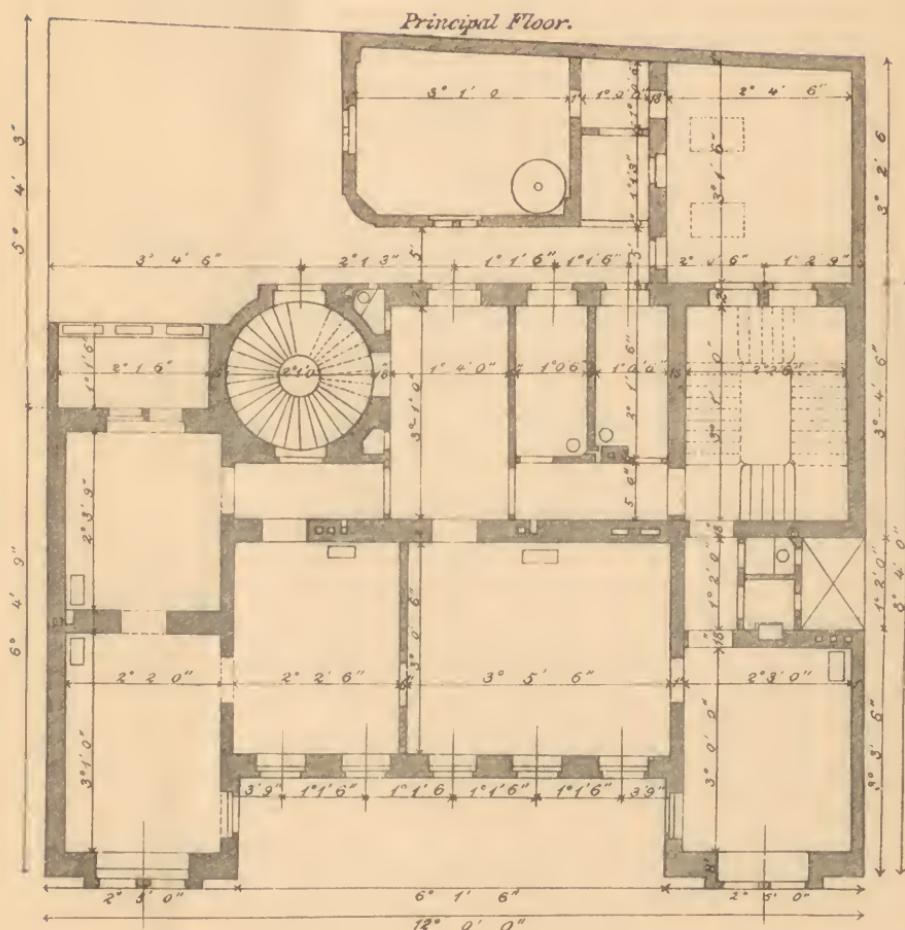
Pl. V. (D.)



Apartment House in Vienna.

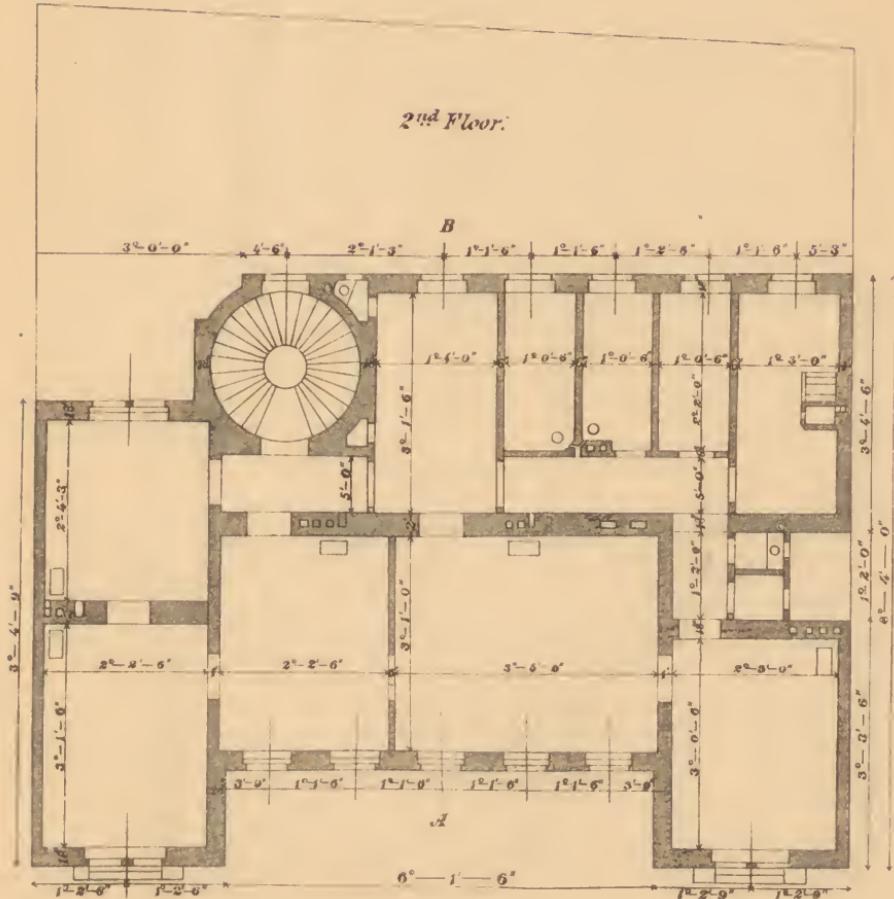
Pl. V. (E.)

Principal Floor.



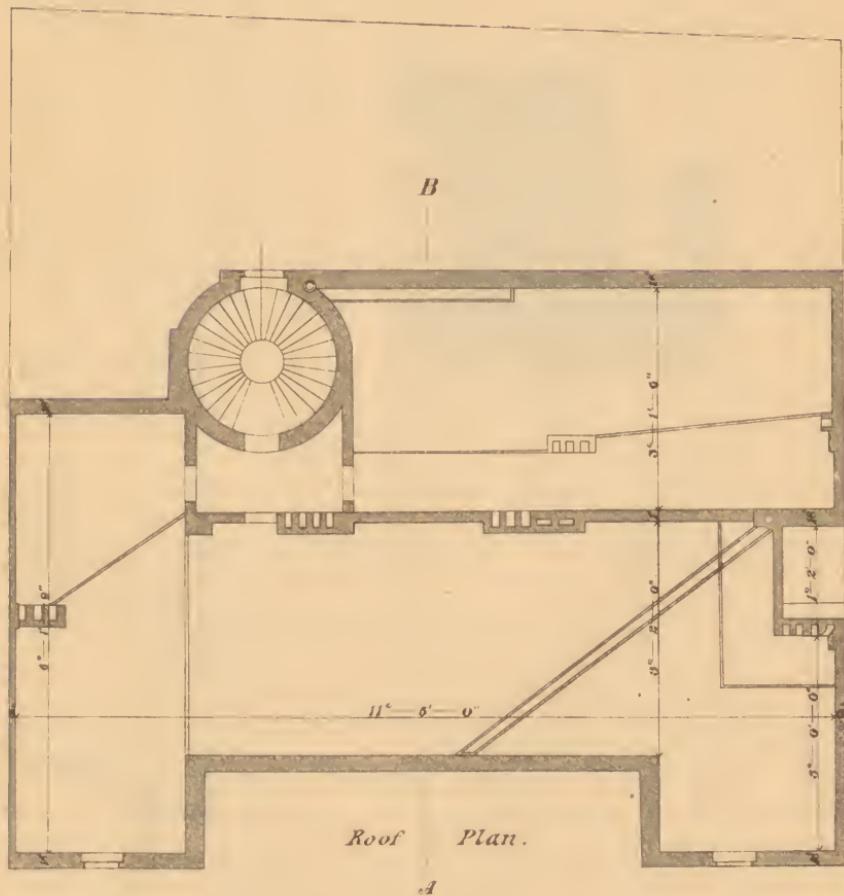
Apartment House in Vienna.

Pl. V. (F.)



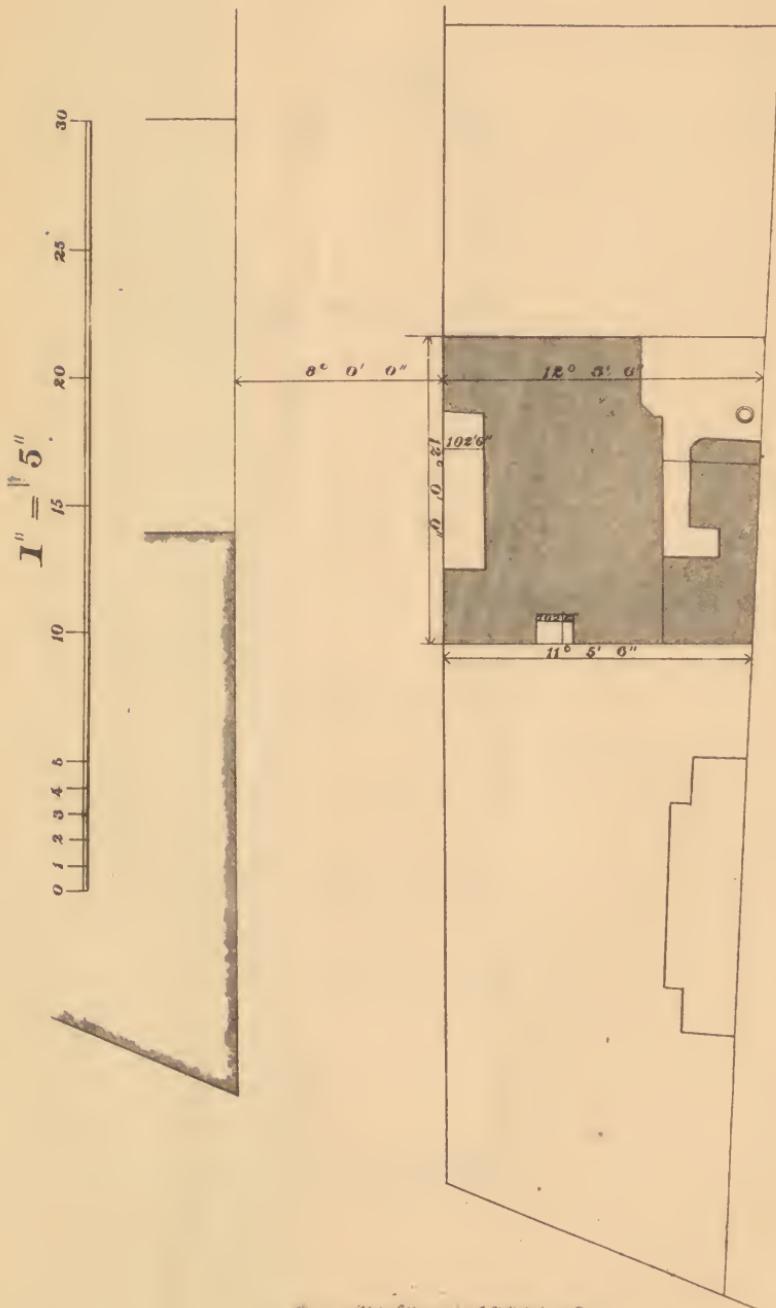
Apartment House in Vienna.

Pl. V. (G.)



Apartment House in Vienna.

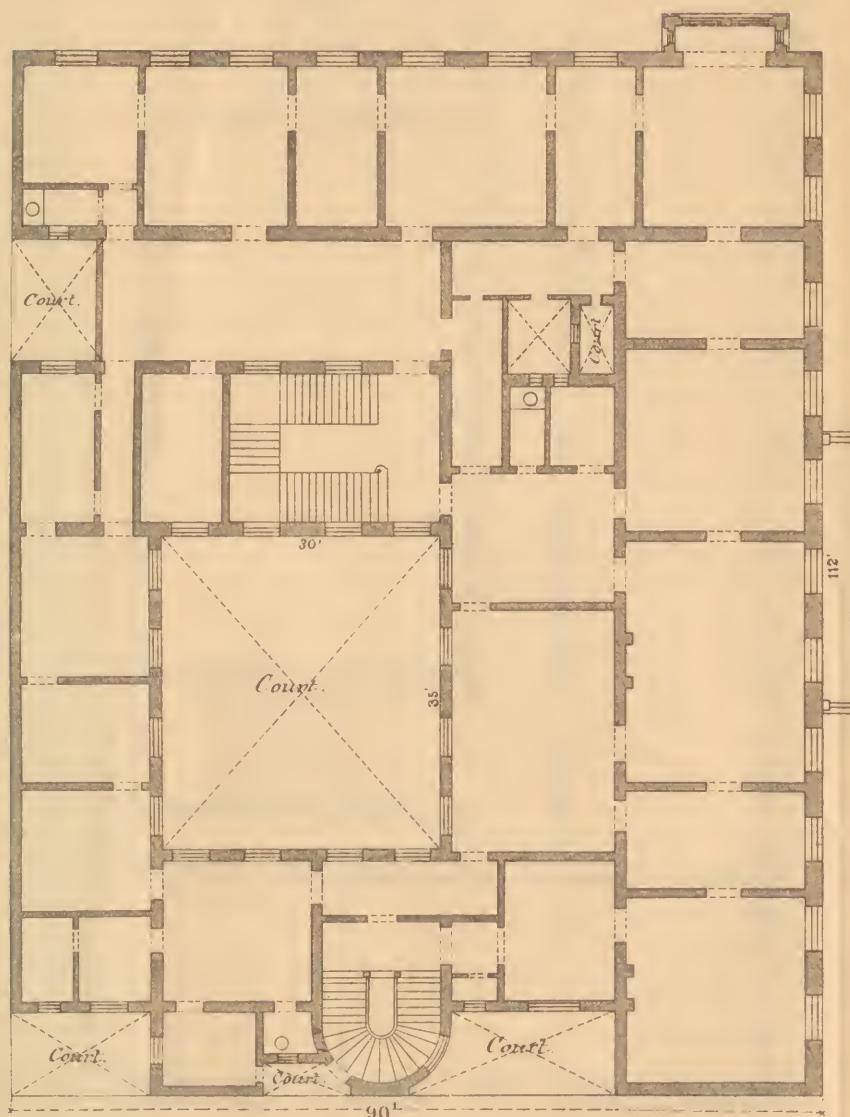
Pl. V. (H.)



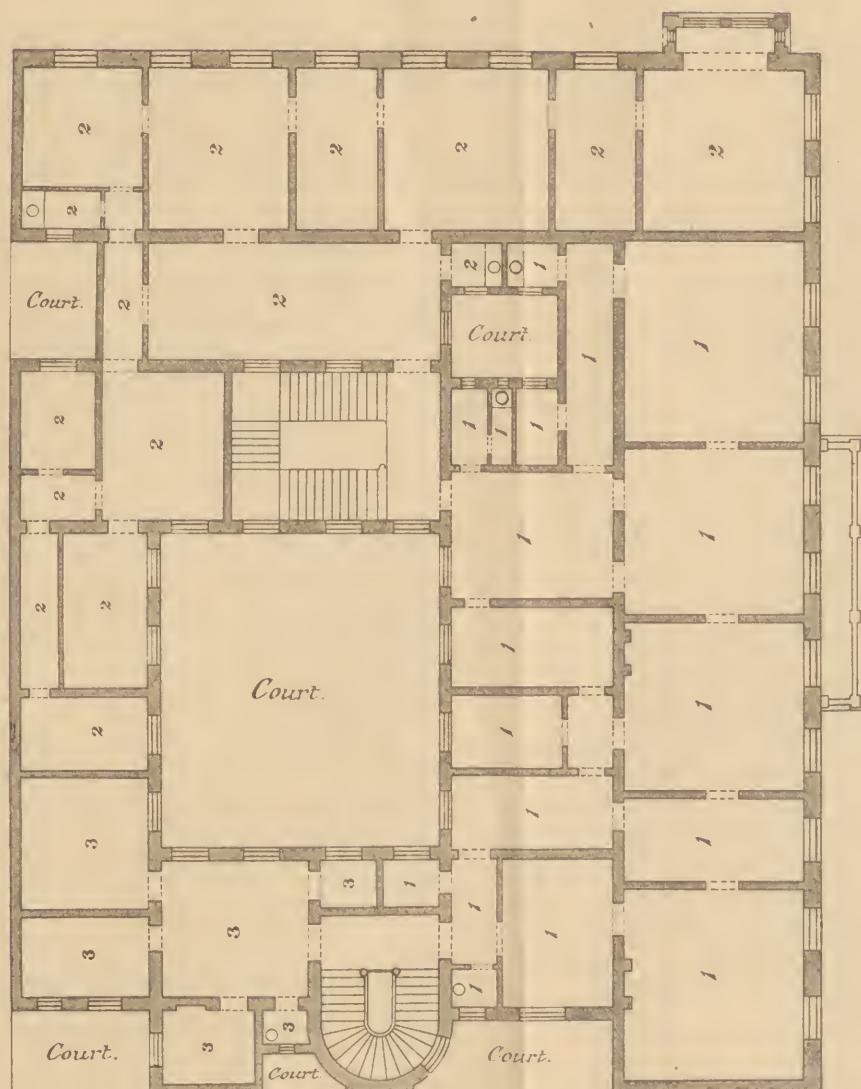
Plan of a First Class Apartment House, Vienna.

Pl. VI.

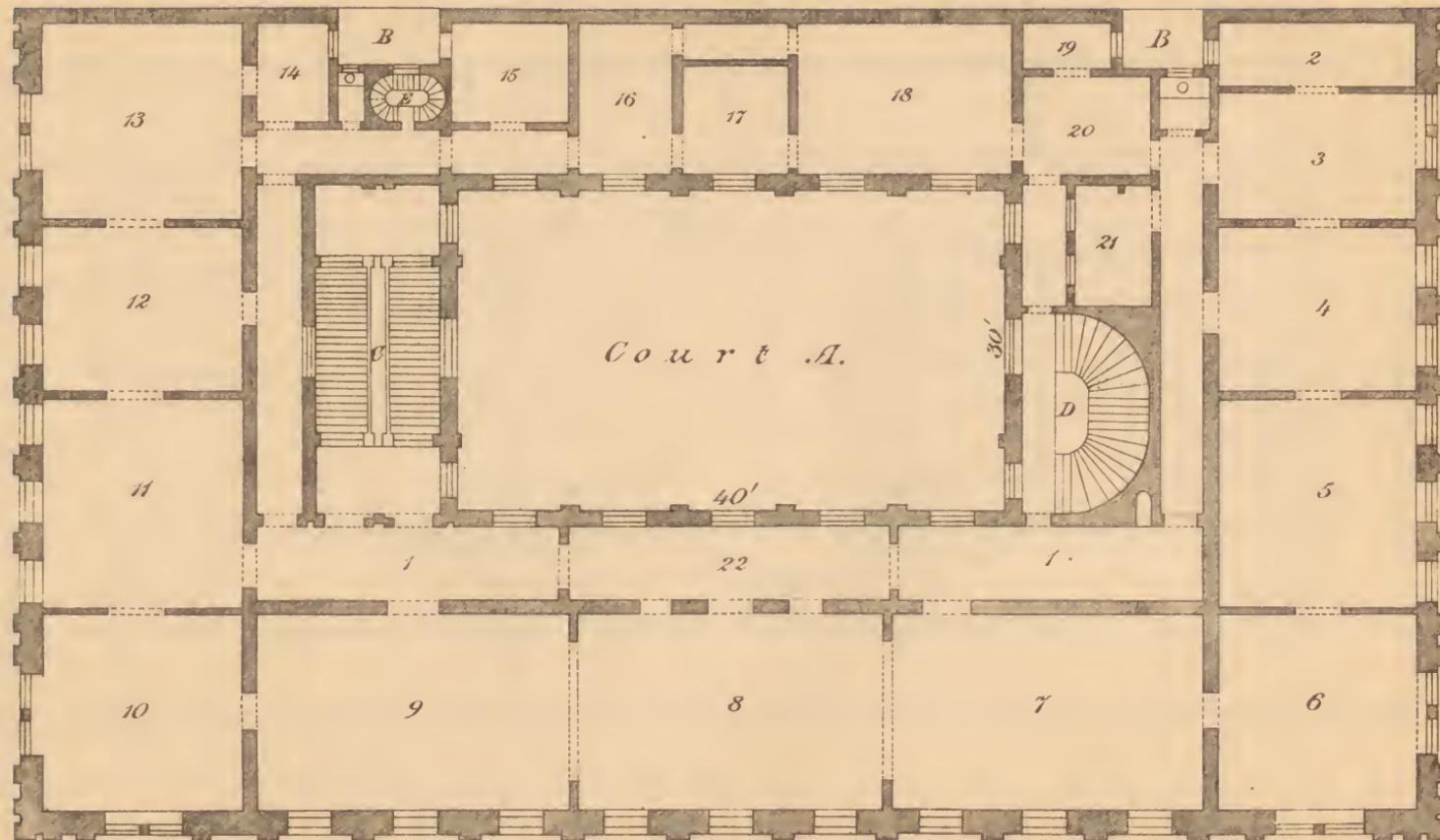
A. Principal Floor.



B. 2nd and 3rd Floor.

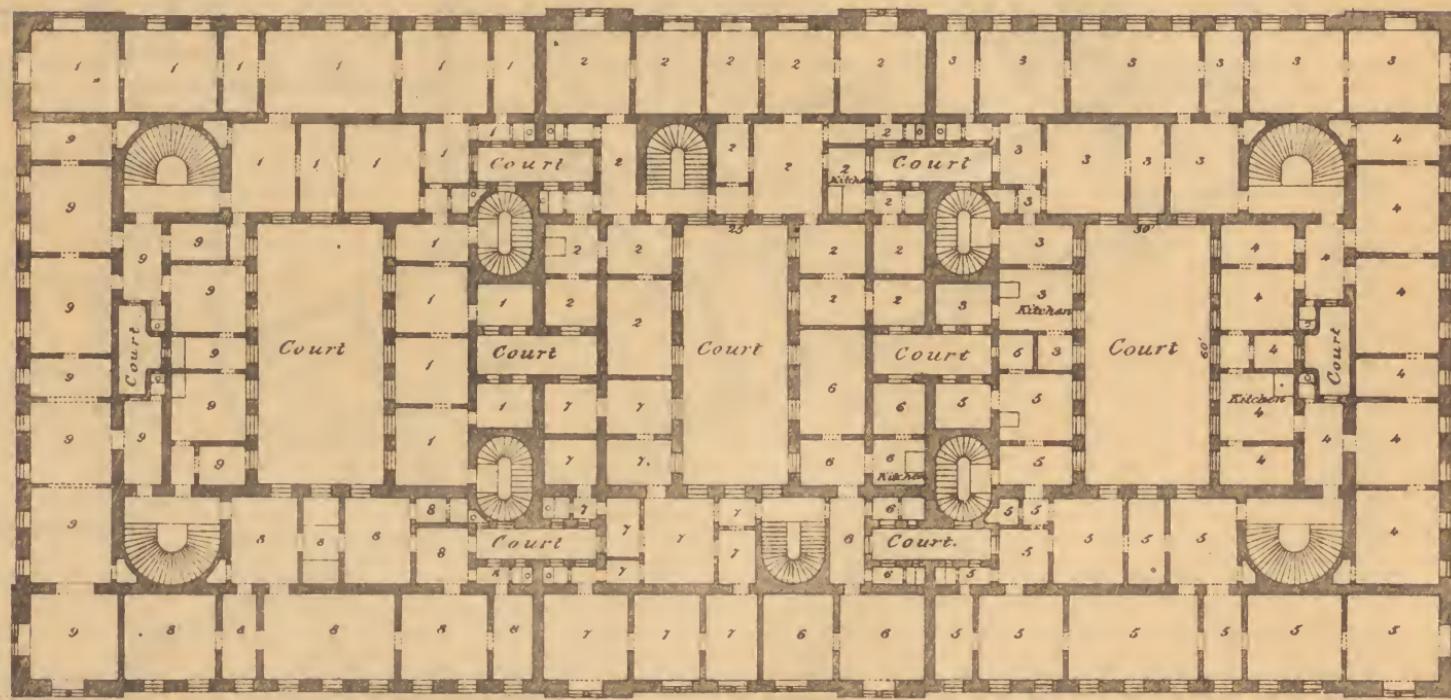


"Palais" of L. Epstein—Principal Floor.



Principal Floor of Apartment House, called "Henry's Court," Opera Ring, Vienna.

Architect: L. G. G.



About 360'.

Principal Floor of Apartment House
by the "Union Building Association" of Vienna.





FAÇADE OF A DWELLING IN VIENNA.

Details of the self-sustaining "Platzel", or Flat-crown Arches,
as constructed at Vienna.

